ELECTRICAL REVIEW

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14th May, 1948

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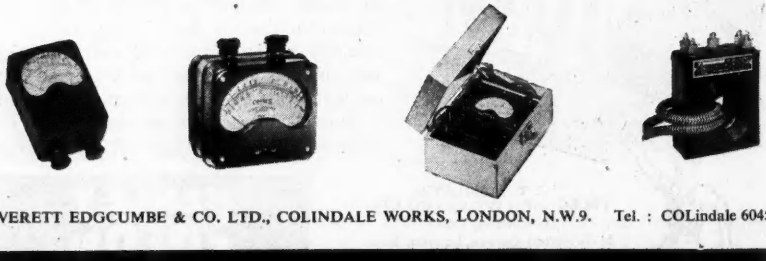

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ELECTRICAL REVIEW

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Costs and Prices

B.E.A.'s Immediate and Future Policy

IT cannot be said that the public are unprepared for the higher electricity charges with which many of them are threatened. Some newspapers, in an endeavour to convince the public that nationalization means more to pay have cleared the ground for the proposed increases.

Those in the industry, and most thinking people outside it, know that the necessity arises not from nationalization but from the steep rises in costs during the past two or three years which all the economy and efficiency of the undertakings could not counteract. The situation has been aggravated by the reluctance of this and past Governments to permit the higher charges which conditions have warranted for some time.

Industrial Consumers Penalized

Much of the burden of increased costs has fallen upon industrial consumers with coal-clause agreements and this, quite apart from the necessity for cheap power, is obviously inequitable. At the same time the domestic consumer, already overloaded from other directions, must not be expected to pay more if increases can be avoided.

We feel that the B.E.A. has not presented the whole story so as to enable the position to be viewed clearly. We are told that about 150 undertakings are incurring deficits, but something should have been said of the other 400 who, presumably, are paying their way, if not making a surplus. No doubt more will be heard of these when the Authority and Boards work out their long-term price policy.

The immediate aim of the Authority and Boards is to avoid a deficit this (their first) year if possible and they are accordingly confining increases to those districts where electricity was already being supplied at a loss, estimated at a total of £7 million for the current period. In other words there is to be no "swings and roundabouts" system, at any rate for the present.

Ultimate Integration

It seems to be the object of the new Authority first to get each district on an even keel, but there is no guarantee that this will tend towards uniformity of charges in any Electricity Area. There will still be districts which, with lower prices, will balance their accounts.

The identity of the former undertakings is being preserved by this endeavour to make each of them self-supporting. So far as intimate relations with the consumers are concerned this is an excellent arrangement, but eventually, we suppose, the separate units will be financially integrated and the weaker ones will have to be supported by the stronger. This is one of the fundamental conceptions behind the national scheme: one reason why an attempt was made to secure a balance between rural and urban districts in each area.

Although it would thus appear as if the immediate steps were away from the ultimate goal this is not quite the case. Many of the districts affected are urban

and it is possible to conceive a situation in which a rural area which, through "economic" charges, was operating at a profit, found itself subsidizing an unremunerative town supply. Therefore, we think, the authorities are justified in closing existing gaps between costs and revenue before attacking the general question of charges.

Transmission in South Australia

THE present is rich in the possibilities it offers of technical progress that may profoundly influence the electrical future. Many of these are speculations only; others are still, and may for some time remain, in an experimental stage. The engineer who has to provide for the immediate future must adopt methods whose reliability and economy have been established by experience. This is exemplified in the letter we publish this week from Mr. R. H. M. Lea, who gives the main reasons for the decision to transmit power as a.c. from Leigh Creek brown-coal fields to Adelaide. It also illustrates how an advance in one engineering field may be linked with developments in others.

E.T.U. and Registration

AMONG many interesting items in the 1947 report of the Executive Council of the Electrical Trades Union presented at this week's Great Yarmouth conference is one on registration of operatives and contractors. It seems that, influenced by the I.E.E. report on the subject, the Council has abandoned the pursuit of compulsory registration and favours instead pressing the Government and the British Electricity Authority to secure statutory measures to ensure proper standards of installation work and appliances. Several branches were, however, to submit a motion at the conference stating that it was the duty of the Executive Council to endeavour to obtain registration by statute.

Results from the Fair

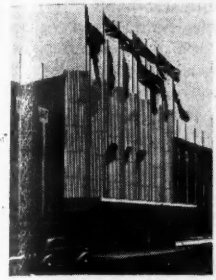
IT is virtually impossible to assess the actual amount of business resulting from a large trade exhibition. Apart from the firm orders placed (which may be subject to modification—or even cancellation because of import restrictions) there are many inquiries which may or may not result in contracts. Therefore any assessment of the amount of business done at the British Industries Fair is necessarily provisional and incomplete. It has been stated that the number of overseas visitors has been smaller this year and this is attributed to the before-mentioned import restrictions which so many countries have had to impose. Nevertheless many of the electrical manufacturers interviewed by our representatives have expressed their satisfaction at the results; all of them appear to think that the Fair serves a valuable purpose even if immediate business is smaller than they had hoped.

Professional Affairs

INCREASING electrical activity in the past twelve months is reflected in the latest report of the Council of the Institution of Electrical Engineers. Particulars of the more recent developments recorded are given on page 773. The increase of membership was not so large as in the previous post-war years, which is understandable, but the rate of growth was higher than in 1938 when only about half the number of new members was admitted. Co-operation with the "Mechanicals" has resulted in model forms of contract conditions and the I.E.E. is joining with the other two leading Institutions in organizing a conference in London in October to which foreign engineers are to be invited.

High Voltages in Germany

ONE of the valuable features of the report on the tour of parts of Germany reviewed on page 787 is the information obtained from manufacturing and operation engineers there about failures of apparatus previously examined in detail by the visitors and the methods adopted for coping with them. Although mainly concerned with high-voltage switchgear, the visitors took the opportunity of discussing future developments, in which d.c. is prominent for long-distance transmission as distinct from grid interconnection, which would call for a solution of the d.c. switching problem (possible in twenty to thirty years, it is said). British practice in switchgear generally compares favourably with that found in Germany, and the destruction of all short-circuit testing plant is likely to handicap progress severely, but in porcelain production apparently much can be learned in this country.



Seen at the Fair

Reviews of Industrial and Domestic Equipment

Members of the Electrical Review *staff have spent much time at the British Industries Fair inspecting exhibits and discussing with manufacturers' representatives the significance of the principal developments to be seen there. The results appear in the following surveys. Photographs for the illustrations were taken by our staff photographers*

Production Drive

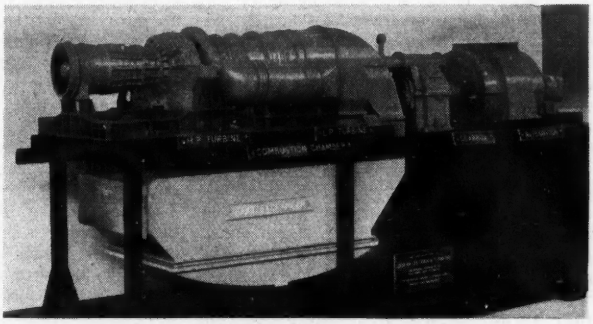
IT is fitting to-day to measure the electrical industrial exhibits at the Birmingham section of the British Industries Fair in terms of the national production drive. Whether the goods we export are purely electrical or otherwise, the electrical industry holds the master key to their production.

This fact at least is evident after inspecting the bewildering variety of exhibits at Castle Bromwich at close quarters. At the outset the importance of efficient generation of electricity for industrial purposes is demonstrated by a number of models of the new power stations which are at present under construction in this country. Models of Staythorpe and Meaford power stations are displayed by the British Thomson - Houston Co., Ltd., and the General Electric Co., Ltd. respectively. The former shows one of the twelve 60,000-kW sets and its complement of boilers, and the latter one of the four 30,000-kW sets.

Much attention is being given at the moment to the gas turbine, but we have felt for some time the necessity for restraint in connection with some claims made for this in certain quarters, if only because the life of the gas turbine can only be determined during the next few years. It was our pleasure, therefore, to hear this view confirmed on the stand of Metropolitan-Vickers Electrical Co., Ltd., who are displaying a model of the 2,000-kW gas-turbine alternator set, which is to be installed at the company's works at Trafford Park, partly on account of the present coal situation, but mainly so that experience may be gained with this type of plant. All the same, we felt the confidence of the company behind this development and it was stressed that the gas turbine will allow considerable opportunity for power-station extensions beyond the normal capacities of the stations, on account of the smaller size of the new plant, and, further, the advantage of the new plant over the steam set in that it can be run up to meet load conditions in a few minutes.

The same line of thought applies to transmission and distribution, in which connection we were reminded by an exhibit of A. Reyrolle & Co., Ltd., of the tendency to depart from the normal oil circuit breaker. The exhibit in question is a 66-kV 1·5 million-kVA small-oil-content circuit breaker of the O.S. type for operation at 33 kV, 66 kV, 110 kV and 132 kV. The 110-kV gear is for export, and many of these equipments are going abroad, particularly to Australia.

Mr. C. A. Stephens, director of Reyrolle's,



The gas turbine will facilitate power-plant extensions

told us that the simplicity of design facilitates shipping, handling and above all maintenance, because of the small number of parts. The circuit breaker, which can be supplied alone if customers wish to provide their own mountings, etc., is in a bushing which measures about 3 ft high and 18 in. in diameter. The oil can be siphoned out in a very short time and either pneumatic or spring operation is provided.

Another interesting distribution development is the on-load tap changer made by Metropolitan-Vickers for use on systems up to 275 kV with fully or partially insulated neutral points. This design renders the equipment almost essentially an export line in contrast with the design for home use on the solid earthed neutral system. The equipment has been ordered for Holland and Spain.

An exhibit by Ferranti, Ltd., shows that power-factor difficulties need not be so acute as they have been in the past. Mounted on a standard 50-kVA 3-phase 415-V condenser, complete with a circuit breaker, is a working model which should convince the non-electrical production manager of the reduction effected in kVA by the installation of a condenser. A tiny induction motor runs at normal working conditions at about three-quarter load, with a power factor of about 0·6 lagging. The line current is indicated by an ammeter. Under the same loading conditions a small power-factor-correction condenser is switched in the circuit, improving the power factor to 0·95 lagging, whereupon the ammeter pointer swings well back.

Still nearer the consumer we have the internal factory distribution. Reyrolle's exhibit low-voltage unit switchgear. The essential point of this is that circuit breaker, busbar and fuse units can be built up into any conceivable formation. The busbars slide in slots in moulded supports in which they are wedged, and no drilling for bolts is required, not even for the busbar connections. The equipment is available for from 30 A to 1,600 A.

The electrical contribution to the modern "materials handling" conception of flow-line production is becoming more and more direct, and the following few exhibits illustrate this trend. A G.E.C. 1-kW h.f. heating equipment is shown in operation soldering the tops of telephone condenser cans at the rate of 700 per hour. Allowance must be made here, however, for the time involved in preparing beforehand the solder formers. The production figure for the hand soldering method is, say, 200 per hour. In the new method the operator first places the formers in the condensers which are then loaded on to a tiny endless conveyor which carries them under a single loop coil (inductor) which induces heat in the outer skins of the cans. The condensers then pass along the conveyor and coil, and finally drop off at the other end.

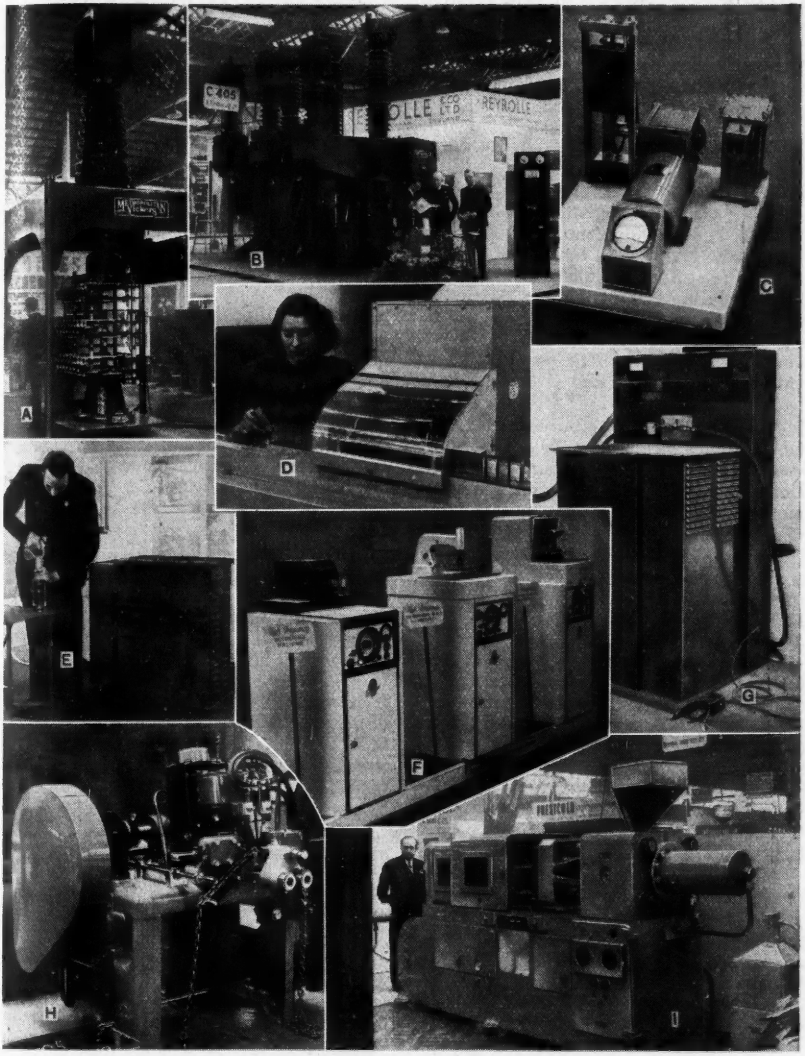
A new model "F.5" h.f. heater shown by Philips Electrical, Ltd., is designed primarily for small-output work, such as soft soldering, but we think the particular interest lies in the fact that it overcomes a difficulty arising out of the tendency to increase the size of valve generating sets to keep in line with the m.g. h.f. sets in respect of size, thus creating a gap at the lower end of the range and leaving the grossly over-rated larger generators, i.e., 20 kV/100 kVA, at work on small output jobs. A soldering machine, a thermoplastic sheet welder and a moulding powder preheater exhibited by British Insulated Callender's Cables, Ltd., are all h.f. heating units particularly suitable for the production line.

A chain welder shown by Holden & Hunt, Ltd., falls essentially into flow-line work, the production sequence being rod feed from the coil into a bender and lacer, then to a welder and on to a stripping machine for the removal of weld upset. If the chain is required for pulley blocks the flow line is extended to the calibration machine. The welder is available in two sizes—8 kVA and 12 kVA—which weld and swage the links at speeds from 18 to 24 links per minute on $\frac{3}{16}$-in. chain and 10 to 12 links per minute on $\frac{1}{4}$-in. chain. The chain is fed along grooves to the welding block where it is gripped by two upsetting tools. Two wedge-shaped hard-copper alloy electrodes then press on the link on each side of the joint, and a low-voltage current flowing through the joint effects the resistance weld.

A stud welder demonstrated by the English Electric Co., Ltd., is used extensively in the manufacture of transformers and in ship yards for welding studs for holding down deck planks. The process is based on arc welding rather than resistance welding, although there is no normal electrode. A small projection from the stud sets the arc length and is immediately burnt away by the arc. The equipment comprises a transformer, an "Ignitron" bank, a resistance regulator, an automatic motor-driven timer

and the stud-welding gun. The average rating is 50 kVA with an instantaneous secondary load of 800 A and a 25-V arc. The production rate is six studs per minute.

The " Karboclean " process shown by the Electric Furnace Co., Ltd., employs a salt bath which is electrically the same in principle as the salt bath used for heat treatment.



(A) This on-load tap changer has been developed for systems up to 275 kV. (B) Simply designed small-oil-content circuit breaker. (C) Working model demonstrating power-factor correction. (D) High-frequency equipment soldering condenser cans. (E) Stud welding equipment. (F) This h.f. soldering machine, thermoplastic sheet welder and moulding powder preheater are all suitable for flow-line production. (G) Small output h.f. heater overcoming a difficulty arising from the tendency to increase the size of valve generating sets. (H) Chain welding equipment. (I) Injection moulding machine

It is actually used, however, for cleaning carbon and scale from parts of automobile engines. The working cycle is not more than 20 minutes, as against at least ten times this period for the sequence of operations of degreasing, shot blasting, etc. The 7½-kW model shown is suitable for a garage for dealing with, say, two engines per hour, but the range extends to a 175-kW model which is suitable for the factory dealing with 200 engines per eight-hour day.

An injection moulding machine shown by R. H. Windsor, Ltd., is essentially flow-line equipment and is used for a wide variety of plastic products largely for the electrical trades. The electrical control ensures a rigid a constant cycle. The time cycle afforded by two pre-set clock switches provides for starting, pressure and cooling. The heating is hand switched and there are three heating elements—external 2½-kW, nozzle 100 W and internal 300 W. The pressure is provided by an incorporated motor-driven oil hydraulic system.

An example of the " out-of-line " materials handling equipment is the " Jones Super 100 " diesel shunting crane demonstrated by Geo. Cohen, Sons & Co., Ltd. It incorporates a motor-generator set which supplies a lifting magnet.

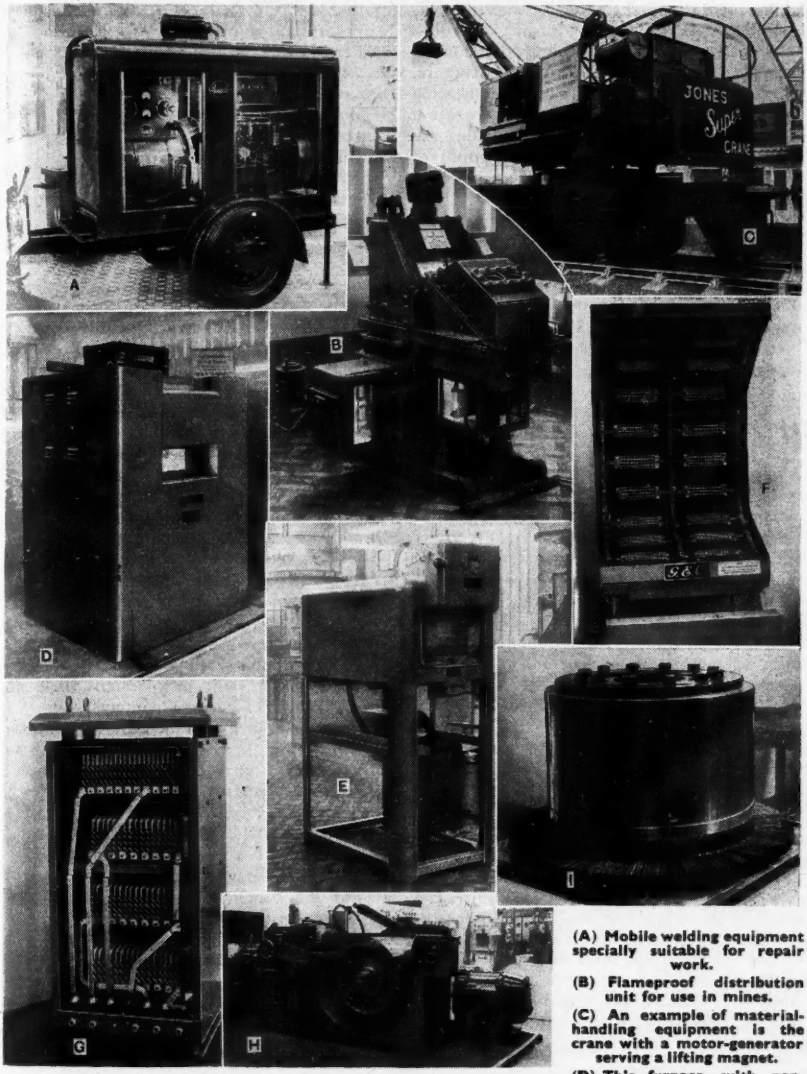
One example of the several exhibits which emphasize the importance of coal mining to-day is the B.T.H. flame-proof general underground distribution unit. It is tested for groups 1 and 2, i.e., methane and pentane. Armour-plate glass panels permit the operator to see the actual position of the isolator contacts. The special six-pole rotary isolating switch is fully interlocked with the oil circuit breaker. The rupturing capacity is 25 MVA at 3,300 V and 10 MVA at 400 V, and the maximum current rating at either voltage is 300 A. An earth leakage trip coil is operated from a core-balance current transformer.

The machine-driving motor for flow-line production or otherwise has been taken for granted for such a long time that it is well to remind ourselves that it still exerts by far the greatest influence on industrial production. Variable-speed driving continues to be the biggest development in this field, and our attention in this connection was forcibly arrested by the size of a commutator for a 600-h.p. a.c. variable-speed motor on the stand of Higgs Motors, Ltd. Variable-speed applications are definitely on the up-grade, and the trend is towards increasingly larger sizes of the a.c. commutator motor. But the particular point of interest we heard in this connection is that the cost of the a.c. commutator motor, which has tended to be a deterrent to the use of the smaller sizes, becomes proportionately lower on the larger machines. Maybe the cost factor is the main reason for the increasing popularity of d.c. for variable-speed work, but in any case we were particularly interested to hear the estimate of Mr. H. Richards, technical director of Marshall Richards Machine Co., Ltd., that 80 per cent of the large machines now produced for the wire industry operate on d.c.

An exhibit by the company is a 36-in. horizontal bull block for drawing non-ferrous tubes (from 1 in. outside diameter) in long continuous lengths at infinitely variable drawing speeds from 100 to 300 ft per minute. The machine is driven by a 25-h.p. motor, and the essential power characteristic of constant torque over a wide speed range is produced by shunt field operation which gives constant h.p. over a range of 3 or 4 to 1, while constant torque up to the basic speed is obtained by voltage control of a grid-controlled mercury-arc rectifier. Such control eliminates the need for heavy current contactors.

The unbreakable rustless grid resistance shown by the Rheostatic Co., Ltd., is a reminder of very long and faithful service, although the dissipation of energy is a point to be regretted. It is of the type used for steel-works rolling mills and cranes, largely to meet the requirements of varying speed. It caters for a cycle of operations on extraordinarily heavy duties, the resistance proper being arranged in steps with suitable busbar connections, in accordance with the notching cycle.

Among the industrial heating equipment shown, Metalectric Furnaces, Ltd., exhibit a 28-kW electric furnace which is designed to provide temperatures up to 1,400 deg C, and is heated by non-metallic silicon-carbide elements. It is used for hardening high-speed steel tools, sintering powdered metals and for firing pottery. In connection with the first application there are facilities for introducing prepared atmosphere into the heating chamber. Apart from the high temperature the main points about the equipment are its compactness and transportability. The equipment is self-contained with its contactor gear, tapped transformer, etc. Milli-volt control is employed.



(A) Mobile welding equipment specially suitable for repair work.

(B) Flameproof distribution unit for use in mines.

(C) An example of material-handling equipment is the crane with a motor-generator serving a lifting magnet.

(D) This furnace, with non-metallic elements, operates at up to 1,400 deg C.

(E) Horizontal workshop furnace designed for tool-room use.

(F) High-intensity infra-red heating oven.

(G) Unbreakable grid resistance.

(H) Bull block tube-drawing machine providing constant torque over a wide speed range.

(I) The cost of the a.c. commutator motor becomes proportionately lower on the larger machines.

A horizontal workshop furnace shown by Wild-Barfield is also designed for tool-room use for hardening, tempering, annealing and pack carburizing. It has a temperature range for nearly all the heat treatments associated with low-alloy and carbon steels, and the temperature control is by energy

input regulation. Protective atmosphere is provided by a "Paragen" burner, and both the atmosphere generator and the control gear are incorporated in the furnace structure.

The G.E.C. high-intensity infra-red heating oven section, which has normal-type heating elements, represents an advance on the reflector-lamp method, in that the input of 2 kW per sq ft of heating surface is about double that of the lamp method. This intensity, of course, varies according to the type of product under treatment, but it is such that heat can be "pumped" well into the work, thus rendering the equipment particularly useful for dealing with heavy masses of metal, such as automobile car cylinder blocks, castings and agricultural machinery, mainly for paint stoving.

"Out-of-line" arc welding is advancing rapidly, and the diesel-electric portable arc welding set displayed by the Quasi-Arc Co., Ltd., is a good example of the trend. Mobility is afforded by the trailer unit with pneumatic-tyred wheels.

The pressure type electric repair vulcanizer for trailing cables shown by the Liverpool Electric Cable Co., Ltd., is a reminder in the midst of a preponderance of new equipment of the importance of maintenance. It is a tubular structure with two hinged half sections each fitted with Wireohms clamped mica elements, loaded overall at 4 kW. The operation temperature is about 350 deg. F. With the sections opened out the cable is placed in the bottom half, the top half is then closed down, the sections are clamped and the electricity is switched on.

Domestic Trends

TO a large extent recent developments in the design of domestic electrical appliances have been influenced by the prevailing economic conditions. The amount of attention given to the production of apparatus for abroad has been brought about not only by the necessity for increasing export trade but also by restrictions on the home market. Apart from the actual limitation of production of apparatus for this country, the high purchase tax is having a stifling effect on sales of such appliances as fires and water heaters. Discouragement of electric cooking in houses where other methods of cooking are available has similarly tended to result in manufacturers paying especial attention to demands from overseas.

This does not signify that general development of products for the home market has been at a standstill. In fact, both in technical design and particularly in appearance there has been a very considerable advance since last year's Fair. Manufacturers have now got through the difficult transitional period between war and peace and most of them are settling down to the production of their new models, so far as materials and labour permit.

The delivery position is very much better than last year. Overseas buyers can obtain many items such as fires and water heaters ex stock, while the longest they are likely to have to wait for any domesti productc is generally a matter of weeks rather than months. The home buyer is not so fortunate though here, with the exception of such articles as refrigerators, the delivery position is generally better than it was last year.

Substantial advances have been made in cookers. Several new models have made their appearance recently and others have been improved. While there is nothing revolutionary in the new designs there are several points of particular interest.

In the first place with the general process of "streamlining" and the elimination of protrusions, sharp corners, etc., there is inevitably a tendency for particular makes to lose something of their individuality. This is not necessarily a bad thing if it means that the stage of evolution has been reached when perfection is being approached. In any case it has the beneficial effect of rendering it necessary for designers to pay more and more attention to detail, with the knowledge that a very minor improvement may be a strong selling point.

A small but important development which shows how things are going is the tendency

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(See opposite page) (A) Falk, Stadelmann "Raydex" two-plate table boiler. (B) Falk, Stadelman R.848 cooker—a larger model of the R.647 type. (C) Special export model cooker produced by Parnall (Yate). (D) B.N.E. model C.49 cooker. (E) Revo "Peerless" cooker. (F) Special adaptations of the "Creda" double purpose water heater for overseas requirements: Model for restricting daytime load fitted with a time switch controlling four of the five 200-W elements, and a unit with built-in cistern for multiple apartment installations abroad. (G) Fisher washing machine. (H) Hoover washing machine. (I) Some of the latest "Sadia" water heaters, including the 20-gal. U.D.B., the 3-gal oval, and 30-gal. thermal-storage models and various immersion elements. (J) "Creda" safety fire with tubular sheathed element. (K) Old and new have been happily blended in the Berry's Electric "Twentieth Century" period fire. (L) Modern development of the Belling "Celtic" log fire in aluminium. (M) New Belling convectors with the "Champion" unit from which they have been developed.

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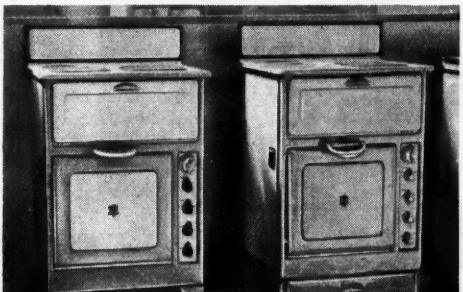
of manufacturers to supply what was till recently their "de luxe" finish as standard without extra charge. As a typical example Belling are now supplying all their cookers in white with black hob (instead of mottled grey). Similarly a two-tone ivory finish with black hob and plinth is the standard finish for the new "C.49" British National Electrics cooker.

To simplify and accelerate production most manufacturers are designing their cookers so that they can be supplied in a variety of forms. Last year, it may be remembered, the Jackson Electric Stove Co. brought out a range of three cookers built up from two sets of components to give either one or two boiling plates and grill-boiler and normal or extra-large oven. Since then several of the new cookers, among them the Parnall, Belling and B.N.E., have been designed to be easily converted from one to two boiling plates and to have either legs, plinth or drawer at the base.

In their "31S" and "43S" cookers



Moffat 43S cooker in its old and new forms

Moffats supply, as an alternative to legs, an interchangeable (unheated) drawer at the base of the cooker.

Though not introducing any interchangeable features Falk, Stadelmann have brought out a larger model of their "Raydex R647" called the "R848." It has a larger oven and two boiling plates instead of one. The appearance of the smaller model has also been altered slightly to match the new cooker; the handle of the hot-cupboard door, for instance, is moved to the right instead of being in the centre. This asymmetrical arrangement adopted last year by Jackson also appears in the new English Electric cooker in its attractive green and cream vitreous enamel finish.

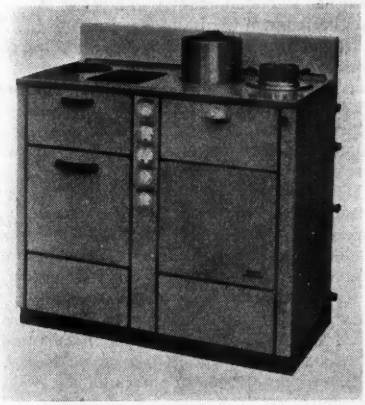
It might be thought that the many new aluminium alloys now available might have found considerable application in cooker design. In practice, however, the use of aluminium is being mainly restricted to components which do not show, such as back stretcher bars and bases and oven packing sides and bases. Parnall, however, in their new range of cookers are offering the choice of either steel or aluminium. The matt-finished corrugated diecast aluminium hob has a pleasing if unusual appearance which, it is said, actually improves with wear. Whether, as new and more durable finishes become available, aluminium will be more widely adopted by other manufacturers remains to be seen.

Hitherto it has been generally believed that the more effectively an oven is lagged the better. Parnall now question this by pointing out that by reducing the lagging to a selected low value it is possible to obtain a considerably shorter preheating time. With an additional boost element at the bottom, this company's new cooker is claimed to reach a temperature of 400 deg F in about ten minutes, as compared with twenty minutes or more with most cookers. Over a period of two hours consumption is claimed to be actually less for heating up and maintaining temperature at 400 deg F than with other cookers, though for longer periods it may be about 5 per cent greater.

A criticism that has been levelled at the use of oven thermostats without thermometers is that it is difficult to say, when the pilot lamp is on, whether the desired temperature has been reached or not. This disadvantage has been overcome by Parnall by the provision of a two-stage thermostat, the pilot light of which is bright, dim or out according to whether full, maintaining or no heat is switched on. Two further refinements on the same cooker are the use of recessed handles and switch knobs and magnetic catches on hot-cupboard doors.

Just before the war the desirability of thermostatic oven control was still being debated; now it is regarded as indispensable and the same position has almost been reached with regard to the use of "Simmer-

stats" on boiling plates. We were interested to see that Belling had carried the process a stage further by fitting a "Simmerstat" to the grill-boiler of one of their models.



"Utility" model Gillott electro-steam cooker specially designed for housing schemes

Admittedly for grilling the device is superfluous but as the grill-boiler has also to be used for boiling, particularly on cookers with only one plate, there seems to be a strong argument for providing it.

This, of course, is assuming that the grill-boiler itself is essential. For many years now it has become normal practice to fit it on all standard British cookers. Now Revo have raised the question again by offering the new "Princess" model either with the usual grill-boiler and one boiling plate or with a separate grill and two boiling plates.

There has long been a difference of opinion as to the relative merits of the side-opening and drop-down oven doors. The latter would appear to have the advantage of providing a convenient resting place for food taken from the oven, but they need to be carefully designed, if they are not to be prone to mechanical faults. Moffats have favoured them for many years and the G.E.C. last year also incorporated them in the new "DC 113" cooker. Now B.N.E. have adopted them for their new "C 49" cookers.

Earlier we mentioned the care that manufacturers are taking over detail. This new B.N.E. cooker provides a case in point. Not only do all the fittings such as boiling plate supports and oven element side screens lift out for easy cleaning, but the hot-cupboard compartment is slightly sloped to collect any spill-over and also there is a gully at the base of the splash back to carry away any moisture that may have accumulated on it. Another recently added refinement in the Belling "64AB" is the provision of a light to illuminate the oven. This model, like others of the same make, also has an inner glass oven door.

It has often been said that to be successful in world markets cookers must be specially designed for the purpose but we are not aware of any manufacturer who up to now has gone to the trouble of producing such models except in so far as making available special finishes and providing for use on two- and three-phase supplies. Now, however, Parnall, as a result of on-the-spot research have evolved a cooker which it is hoped will meet the peculiar requirements of the overseas buyer. Appearance is of obvious importance in competing with other countries and a bowed front with recessed switch knobs, a splash-plate integral with the hob and a striking black and white finish are features which make an immediate appeal to the eye.

To meet individual preferences alternative cooker heights of 32 and 36 in. are available. As the grill-boiler is not so much favoured abroad as it is in this country it has been omitted from the design: instead three or four boiling plates are provided, grilling being done at the top of the oven which is fitted with top and bottom elements. The company's two-stage thermostat is also being employed to control the two elements. The drop-down door has a patented hinge.

Interchangeability of replaceable cooker parts is now taken as standard practice in this country and this applies also to these export models. It is to be hoped that as other specifically export models come along they too will conform to E.D.A. standards so that the overseas buyer will be assured that no matter what make of British cooker he purchases, replaceable parts of any other make will be certain to fit it.

Largely because of the restricted accommodation available in the modern kitchen the horizontal type of cooker with hob alongside the oven which made an appearance two or three years ago has apparently been abandoned, for the time being at any rate. The combined cooker, steamer and water heater made by Gillott Electro-Steam Cookers appears, however, to be making progress. The "utility" model just brought out for housing schemes is identical with the standard

apparatus except for the omission of the somewhat elaborate back splash-plate with a clock. Besides the usual roasting, boiling, grilling, frying, etc., this equipment provides steam for cooking vegetables, stews and puddings; fresh boiling water at the rate of two pints every three minutes for making tea, etc.; and also domestic and bath water. A saving of about £30 on the equipment of a house with cooking and hot water facilities is claimed to be achieved by the installation of this apparatus apart from the economy accruing to the user as a result of not having to provide a kettle and other utensils.

To meet the demand for small cooking appliances for flats, etc., there have been several interesting developments. The new Revo "Peerless" cooker is of striking modern design finished in white enamel relieved with red decoration and black handles. It has an 8-in. boiling plate and grill-boiler and alongside the oven is a compartment for heating plates. In addition to the grill-boiler the oven is provided with a separately-switched bottom element. Of equally up-to-date appearance is the new Falk, Stadelmann "Raydex" two-plate table cooker, available in white, cream or mottled grey with chromium edges. It has one 8-in. and one 6¼-in. plate and is provided with a drip tray.

Smaller Appliances

Kettles, coffee percolators, etc. share the general tendency towards improved appearance. The new Bulpitt "Royal" kettle is "streamlined" with a quick-pouring spout blending well with the general design. A second new "Swan Brand" product is an electric percolator set complete with sugar basin and cream jug. Finished in chromium plate and fitted with attractive black plastic handles the complete set is mounted on a circular black anodized tray with chromium handles. Another new kettle of pleasing design is the "Revomatic", the makers of which have also brought out the Revo "Electrojug," a utensil of jug-like shape for boiling up to three pints of fluid.

With the virtual closing of the home market there have been few developments recently in fires, but there has been a marked revival of interest in imitation coal and log fires. Many of the Belling period models, such as the "Celtic," "Adams" and "Stuart," brought out about fifteen years ago, reappear in improved form, with the grates constructed of aluminium alloy instead of wrought iron. Besides giving a more realistic effect of age this material of course also reduces the weight considerably. Old and new have been happily blended too in the new Berry's Electric "Twentieth Century" period model finished in cream enamel with 3-kW elements at the front.

Something of a novelty is an imitation coal fire in which the heat actually emanates from the fuel. The base of this model, the Bratt Colbran "Sunrise," is made from real firebrick and cigarette ends, paper or matches inadvertently (or purposely) thrown into it are consumed.

Despite the restrictions there is still a steadily growing demand for convectors. We were particularly interested to see on the Belling stand a modern development of the oil-stove-like "Champion" heater, which still seems to be very popular. To test the public's reaction the tubular sheathed element (employed in the "Creda Brentwood" convector introduced at last year's Fair) has been incorporated in a radiator, special emphasis being placed on its shock-proof qualities.

Water Heaters

Interest in water heaters centres on apparatus produced to meet the special requirements of overseas countries. A 20-gal. thermal storage unit loaded at 3 kW with built-in cistern and ball valve designed by H. Fisher (Oldham) has been ordered in large quantities for abroad and is to be installed in every house of a town being built in South Africa. A similar unit, a model of the "Creda" 20-gal. double-purpose unit, is specially intended for multiple apartment installations abroad. Another adaptation of the same model, with the Norwegian and Danish markets especially in mind, meets the need for restricting the daytime load by eliminating the normal 500-W top element and having instead at the bottom a 200-W element permanently in circuit (not thermostatically controlled) and four additional 200-W elements (thermostatically controlled) under time switch control.

In addition to the well-known 20-gal. "U.D.B." (under-draining-board) unit, Aidas have produced, for export only, a 30-gal. model. An attractive oval model is also available for overseas in 1½- and 3-gal. sizes. Decorative blue bands add to the pleasing appearance of these and other "Sadia" export models. Both the English Electric Co. and Hotpoint are now making thermal-

storage heaters of more or less conventional design for home and overseas. The English Electric are concentrating on the 1½-gal. size, but Hotpoint have a range from 1½ to 36 gal.

A promising development in the insulation of water heaters is the use by Hotric of peat instead of cork in all their models. It is claimed that tests prove that peat is up to 25 per cent more efficient than granulated cork, resulting obviously in a considerable saving of electricity. The packing density is 6¾ lb per cu ft. Unlike cork it is unnecessary to take precautions after packing against expansion with subsequent pressure on fittings and inner containers. Peat is also said to be free from all fungoid growths.

(A) "Atlas" fitting for new 2-ft fluorescent tubes. (B) "Ekco" display introducing the new 2-ft fluorescent tubes. (C) New Thorn "Mary Ann" cleaner. (D) "Revomatic" heat-controlled iron. (E) Selection of new Ferranti clocks

Though the purchase tax on washing machines has been reduced from 50 to 33⅓ per cent., their price is still too high for the average household. Hoover have, however, produced a machine which besides being low-priced can be accommodated in the smallest kitchen. It is sold at about one-third of the price of other types of machines on the market and measures only 17 in. by 16 in. by 31 in. and fits comfortably under the draining board. As a pulsator revolving vertically at 600 r.p.m. is recessed in the side of the machine instead of the normal agitator, the 6¾-gal. stainless-steel tub, the whole of which is available for holding the washing, is claimed to have as large a capacity as the usual machine. The manually operated wringer, which folds up and fits inside the tub, appears very small—its self-adjusting rollers are only 8 in. wide—but we are assured that it will take blankets. The table top when removed fits on to the back held by the wringer to form a tray. The machine is finished in cream with a foot-recessed black plinth.

The production of an absolutely foolproof wringer is the aim of all manufacturers. H. Fisher (Oldham) claim that their safety device is unique in that it provides instantaneous pressure release by either upward or downward movement of the release bar. An automatic visual pressure indicator is provided on the top of the tension screw. Another interesting feature of this company's washer is that sliding legs are fitted to the lifting door at the rear of the cabinet which forms a stand for a receptacle to collect the clothes after wringing. An overload device prevents any possible risk of damage to the motor. Like other kitchen appliances wash boilers tend to become more "streamlined." A new "Creda" model has no legs but is fitted with a neat plinth with foot recess.

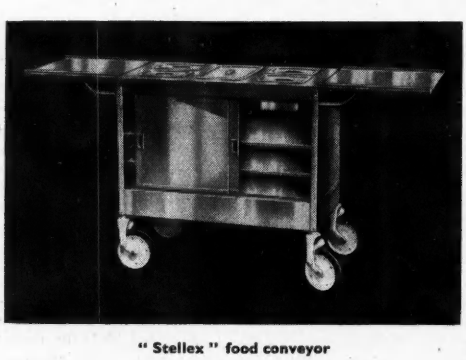
"Streamlining" and thermostatic control are now practically universal features of all electric irons, the appearance and design of which leave little to be desired. Among new models the "Revomatic" is noteworthy for the incorporation of the pilot light in the side of the body instead of in the customary position in the handle, and also for the provision of an air space between the one-piece moulded handle and the body so as to ensure

maximum heat insulation. Exceptionally rapid response of the thermostatic control has been achieved by placing it in direct contact with the metal plate below the mica element.

The Falk, Stadelmann "Raydex" iron, the standard model of which is chromium-plated, is also now available in primrose and green for export.

Although the home demand is enormous, even with the recent addition of 33⅓ per cent purchase tax to the price, refrigerators are still being made almost exclusively for export. While such a high standard of workmanship is to be found, as in the new 6·4-cu ft model which the English Electric have just produced specially for export, there need be no fear of British products not finding a ready market abroad. The fit of the door is such that a piece of tissue paper can just be pulled out at any point without tearing, and operation is noiseless. The only exterior projections on the sheet-steel cabinet are the handle of the door and the control knob which gives eight settings of coolness and "defrost" and "off" positions. The compressor and its auxiliary gear are of the hermetically sealed type and no maintenance is needed.

The main development so far as lighting is concerned is the recent introduction of 2-ft 20- and 40-W fluorescent tubes. Available in white, warm white and a new colour, "peach," these open up great possibilities of applications to the home and already manufacturers are beginning to design fittings to accommodate them. In an attractive "Atlas" fitting the "Quickstart" unit does away with the necessity for the usual starter switch, gives almost instantaneous starting of the tube and keeps it running even with severe voltage variations. For the longer tubes Falk, Stadelmann have employed louvres, new plastic materials and plate glass to good effect. The same company has also brought out a range of British-made glass shades specially designed to fit 2¼-in. galleries for Continental use.



"Stellex" food conveyor

Great Britain has made remarkable strides since the war in producing types of glassware previously imported. Several exceptionally beautiful decorative effects have been achieved in the latest range of Berry's Electric pendants, ceiling fittings and wall brackets.

While improvements in general appearance are the most obvious development in the design of vacuum cleaners there have been several small but useful technical advances. In the new Thorn "Mary Ann" outside-bag type unit, for instance, there is an automatic closing device on the bottom of the bag to ensure that no dust falls out when the bag is being removed for emptying. The handle is counterbalanced so that it will stay in any desired position, rubber finger grips providing comfortable hold. Aluminium has been incorporated where possible to reduce weight, and the provision of both agitator and brush give maximum cleaning effect. A headlight concealed at the base of the handle illuminates the surface of the carpet. Both the Hotpoint "400" model and the similar B.T.H. "500" unit for export now have their aluminium bodies finished in the attractive new "Dimenso."

Wood in traditional and modern designs, mirror glass and chromium, and coloured plastic are being employed to good effect in clocks. A large number of new designs are being introduced by Ferranti, one of whose movements is also to be found in a novelty clock in which is incorporated a model ship being tossed on the waves.

As was the case with last year's Fair most of the vacuum cleaners are to be found at Earls Court, where there are nine exhibitors. Although there seems to be little new in this sphere it is evident that manufacturers have improved upon existing models and they are now in a better position to meet customers' orders. Apart from vacuum cleaners other domestic appliances are to be seen in this section. Hoover are exhibiting their new washing machine at the Earls Court Section as well as in the Birmingham section of the Fair.

A device which has not been on the market for some years reappears: it is the "Polivac" electric shoe cleaner. This modernistic unit, which is driven by a ¼-h.p. universal motor, is fitted with interchangeable brushes and pads and incorporates a suction device to prevent the dispersion of dirt and germ-laden dust.

The "Stellex" food conveyor which is shown at Olympia by C. H. Blackburn & Co., Ltd., is primarily intended for hospitals and can cater for 35 to 40 persons. It is constructed of sheet aluminium, efficiently insulated, on an iron framework making a unit suitable for heavy-duty work. The chamber housing the 1,600-W black-heat element is situated in the centre of the hot cupboard, forming a partition between the two compartments. A bain-marie hob plate with five containers is provided. Hinged and heat-insulated top covers are fitted which when open rest on the rubber-covered handles to form serving trays.

The electric clock industry is represented in some strength this year at Olympia where is what has been described as the finest and most comprehensive range of electric clocks in the world. In addition to alarm clocks, striking and chiming clocks are also exhibited but at present the latter are for export only. There are also systems of synchronized dials controlled by a master pendulum or, if for use at sea, by a lever escapement, and numerous types of industrial clocks, time recorders, switches and controllers.

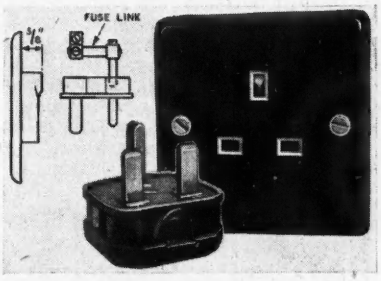
As in previous years, most of the lighting fittings appear in the two London sections. Many artistic and ingenious examples of standards, pendants, wall brackets and shades are to be seen on a large number of stands.

Wiring Accessories

EXHIBITORS in the engineering and hardware sections at Castle Bromwich number 1,121, 74 more than last year. Quite a few regular pre-war exhibitors have returned, particularly to the Electrical Section, thus making the display much more varied than the last one.

A few more makers of small wiring accessories are exhibiting this year, too, but the criticism made last year that this class of component was not represented nearly well enough still holds good.

It is not always realized that there are seventeen different gauges of plugs and sockets in general use. Only seven of them are defined in B.S. Specifications. Last year two prototypes were on view of the 3-kW all-purpose outlet designed in conformity with B.S. 1363 to accommodate a plug containing a cartridge fuse (13, 7 or 3 A) with three rectangular pins. Since then several more

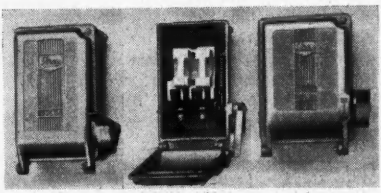


Fused plug outlet and plug with rectangular pins (Iddon)

makers have gone into production of these accessories, but only one new one is displayed at the Fair.

This is the "Nettle" model produced by Victor H. Iddon, Ltd., and is primarily intended for ring main circuits. The outlet is shuttered and earthing is obtained by securing the cover to the conduit box by the fixing screws; an additional separate earthing terminal is provided. A feature is the shallow projection (⅝ in.) behind the socket plate. The socket terminals are spring loaded and the plug terminals are solid with the pins and can be withdrawn from the base for easy wiring; one pin carries the cartridge fuse link under the cap.

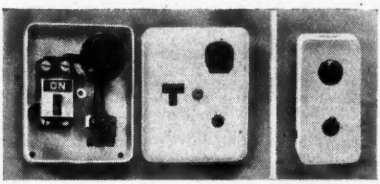
Switch-socket outlets of 5- and 15-A ratings shown for the first time by the General Accessories Co., Ltd., are combinations of the "Surrey" a.c. micro-break switch illustrated last year and the "Clix" shuttered socket. They are of smaller dimensions than normal and can be easily reversed for right or left hand cable entry. The surface patterns are full hollow backed, allowing cable room.



Zinc alloy die-cast switch boxes (Revo)

The flush patterns can be set square on the wall even though the conduit box may be out of square and out of depth with respect to the wall.

Switch-fuse boxes are now die-cast in zinc alloy by the Revo Electric Co., Ltd. They are compact externally with plenty of wiring room and knock-outs at top and bottom. The new cooker control unit was not ready in time for exhibition, but the "Coolex" model introduced by Falk, Stadelmann & Co., Ltd., was shown in a white enamelled box of pressed sheet steel. Beside the double-pole 30-A main switch with a mechanical flag indicator there is a single pole 15-A



Control units for cooker and water heater (Falk, Stadelmann)

switch to control a D. & S. three-pin fused plug. The water-heater control unit is similarly enclosed, having a 15-A double pole switch and ruby pilot lamp window.

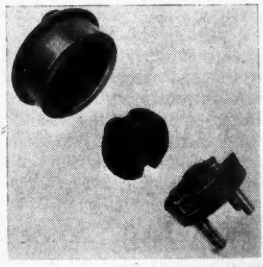
A three-pin 5-A plug connector produced by Barries Electrical Agencies, Ltd., is completely enclosed in tough rubber of substantial thickness for rough usage. The cap is secured to the body by two screws, the tightening of which secures a cone grip upon the outgoing cable.

Moulded "Tunion" plugs are being made in two-pin round and flat as well as three-pin flat types for 5 and 15 A. A neatly contrived V. & E. product is a luminous front door bell push associated with a name plate or house number, which is illuminated from behind and flickers to attract attention when the bell is rung; energy is supplied from a bell-type transformer.

Metal-clad fuse-switches made by Stanton & Co. have contacts of novel design. The cartridge fuses are replaceable simply by lifting a clamping lever, which must be secured by a safety catch before the lid can be closed. The lower fuse ends make contact directly with the moving blades and are pressed together by shrouds, moved horizontally by cam clamping actuated by the handle shaft. Intermediate contact connections are thus dispensed with and no spring contacts are in operation anywhere when the switch is closed. The cases are standardized for from 15 to 60 A at up to 550 V, so the range is consequently suitable for multi-switch panels employing bus-bar chambers. This range is available for double- or triple-pole and neutral switching.

In addition to the flexible metallic tubing of galvanized steel strip made water tight by asbestos or rubber internal packing, shown by Metway Electrical Industries, Ltd., last year, flexible conduit is now offered which is made up of p.v.c. sheeting reinforced with inner and outer spirals of brass wire instead of steel.

The lately introduced consumers' house-service unit of Revo design, which complies generally with the E.D.A. specification, has three pressed steel enclosures whereas the type made by G. P. Dennis, Ltd., is a single steel cabinet flush fitting when built into a wall. The box portion is sunk single brick depth (4·5 in.) while the front frame and door, which are removable, project 3 in. from the wall plaster. All live parts and wiring are shrouded and the rewirable fuses are non-interchangeable as between the cooker, heating and lighting circuits. There is space for an extra meter.

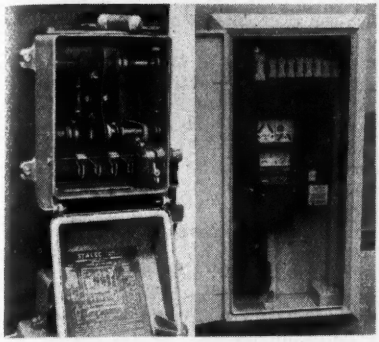


All-rubber plug head (Tunion)

Three other Dennis items are a cooker control unit in an aluminium-alloy case and a similar unit for controlling a wash boiler or immersion heater; the difference is that the micro-gap main switch is replaced by a three-heat rotary switch and separate doors are provided for the fuse and switch compartments, which have back as well as top and bottom entries. A very competitive control unit for small dwellings of the pre-fabricated class is enclosed in a combination cast alloy and pressed steel box of small dimensions and weight.

An attractive new way of controlling

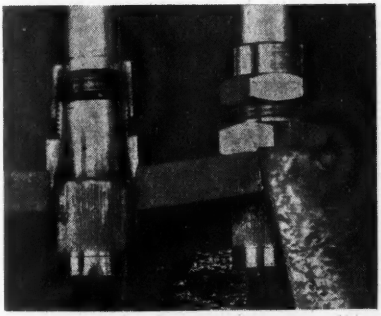
boiling plates is demonstrated by the Rheostatic Co., Ltd. A six-point five-heat switch is used to control a three-circuit element in the correct sequence to provide full, half,



Left: Switch-fuse box with novel contacts (Barries) Right: House service wall cabinet (Dennis)

slightly less than one-quarter and two lower heats (250 and 160 W) for simmering purposes. This method reduces very greatly the number of contact operations and reduces load instead of switching directly on and off, so lengthening the useful lives of both switch and element. The switch is of a very simple micro-gap type, consisting of a rotating insulated spindle which lifts sprung leaves off fixed studs, contained in a porcelain body.

Conduit fittings are to be seen on only two or three stands. The "Simplex" range now includes zinc alloy and aluminium conduit, boxes and fittings. The Northern Aluminium Co., Ltd., draws attention to light alloy conduit, armour and sheathing for cables.



Universal gland for copper sheathed cable (Pyrotenax)

Cable makers, headed by the C.M.A., have returned to the Fair in force. Twenty-four of them are represented and among their exhibits are samples of the new cables sheathed with a seamless aluminium tube by Johnson & Phillips, Ltd. (See *Electrical Review*, 23rd April, p. 629.) The all-brass universal gland for mineral-insulated and copper-sheathed cable, which was standardized last autumn by Pyrotenax, Ltd., consists of three parts. A compression ring is specially shaped to bite into the copper sheath when the gland nut is screwed down over the ring on to the gland body, which is used in conjunction with a screw-on pot type seal.

A new tool shown by Donald Ross & Partners, Ltd., is the "Twinner" multi-jig set which obviates setting-up difficulties in welding. One model is specially made for butt-soldering copper wire and strip for the cable and electrical industries, with 100 A intermittent rating for 200/250 V input and 2, 4 or 6 V output.

To cater for the needs of manufacturers of instrument wires a press has been developed by Foster, Yate & Thom, Ltd., for assembling the barrels and either metal or plastic flanges of bobbins at the rate of 20 per minute.

Wire butt-soldering machine (Ross)

Last year's Walsall prototype of the "all-purpose" fused plug and socket outlet with rectangular pins, complying with B.S.1363, was a flush model. This year the surface type is in production, having a bakelite cover slightly curved at the top. The shutter mechanism for the live pin sockets has been designed so that the action of the earthing pin releases the shutter, but the latter does not operate until the live pins are pressed home. A spare cartridge fuse is fitted in the plug cap. A feature of the plug top is that it forms an overlapping cover to the base, which is intended to ensure that any discharge (if the fuse is ruptured) will be restricted within the plug top.

This type of plug and socket has now also been incorporated in a cooker control unit.

This has a cast iron case with rounded corners and back as well as top and bottom entry, with bushes, being available in silver grey, cream and mottled enamel.

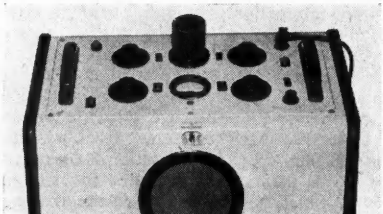
A new industrial switchfuse box, or switch only in a case of half size, is available for 15, 30 and 60A at up to 600 V, double- and triple-pole. It has a new type cable clamping entry plug which is interlocked with the lid of the case.

Instrument Exhibits

THE scientific instruments group at Olympia this year is primarily intended to illustrate the varied applications of electronic instruments and allied devices. Many of the instruments shown may be familiar to British engineers as they were exhibited at the recent Physical Society Exhibition. This, however, does not detract from the value of the Fair display.

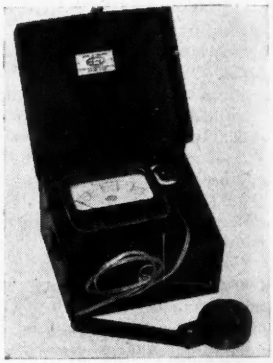
Among interesting developments in electro-medical appliances is an instrument by C. H. Blackburn, Ltd., which overcomes the skin erythema frequently met in the treatment of conditions calling for interrupted galvanism. This is achieved by applying a normal stimulating pulse of relatively high amplitude and short duration succeeded by a low amplitude pulse of long duration and opposite polarity which persists for the whole of the interval between successive stimuli. The electro-myograph shown by Stanley Cox, Ltd., is a diagnostic unit for use in the study of nerve and muscle disorders by displaying the voltages produced in the muscle on a cathode ray-tube.

Apart from numerous other instruments covering almost every conceivable medical requirement the Marconi universal physiograph may be seen which is suitable for a variety of biological uses including encephalography, cardiography and myography. It is assembled as two portable units, one housing a double-channel differential push-pull amplifier, head electrodes and interconnecting cable, the other containing the power unit, a two-pen recorder and a cathode-ray viewing unit.



Electro-myograph (Stanley Cox)

Among the more usual or conventional valve-operated instruments a watch rate recorder is exhibited by Dawe Instruments, Ltd. In a very short space of time this instrument gives a printed record of the performance of a watch which may be used to determine such factors as rate, position errors, isochronal errors and faulty components of the movement. On the same stand a dynamical-balance machine for small cylindrical bodies (such as rotors and small armatures) can be seen. It indicates the position of out-of-balance and the amount of correction needed.

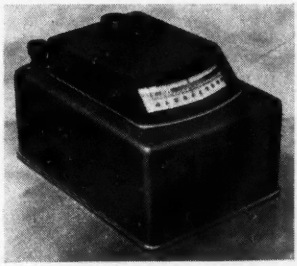


Evans Electro-selenium light meter

Valve-operated counting devices are now widely used in industry and many new instruments have been developed recently to meet various specialized requirements. An addition to the "Cintel" range of industrial electronic instruments is a device for batching small parts in numbers up to 256. It also indicates the number of batches made and the total number of parts counted.

As would be expected, a large number of indicating instruments are shown at Olympia. Existing instruments which have been improved in some way, either by redesigning the case or movement or incorporating overload protective devices and illuminated scales. The Victoria range of panel mounting milliammeters is now fitted with overload protection which instead of disconnecting

the movement, connects a low resistance shunt in parallel with it and locks the pointer at



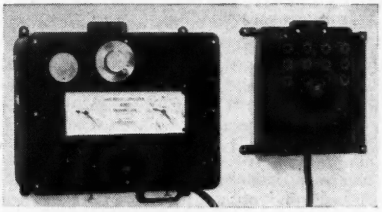
New Pullin galvanometer

full scale deflection until the reset button is pressed.

A new range of moderately priced galvanometers to suit a diversity of requirements has been introduced by Measuring Instruments (Pullin), Ltd. The instruments can be provided with full-scale deflections from 1 μA upwards with either pointer or light indication. In sizes from 10 μA upwards, the movement can be of the suspension or pivoted type, the suspension types being provided with a locking device. Another indicating instrument is the "Eel" photometer which is intended to meet the needs of the specialist faced with the problem of measuring, with an unusual degree of accuracy, light ranges not effectively covered by the conventional exposure meter. Each instrument is individually calibrated, the full-scale deflection, depending on the particular requirements, being from 1 ft-candle upwards.

An example of radio-frequency heating equipment is to be seen at Olympia where the "Airmec" 5-kW generator is demonstrated. It is claimed that this unit is the smallest and most compact generator of its power rating in existence.

Among the precision instruments at Olympia is the Everett Edgcumbe "Synclock" time transmitter primarily for marine use. It provides a means of adjusting the timekeeping as a vessel proceeds on an eastward or westward course and controls



"Synclock" ship's time transmitter

any number of slave clocks from a central point. The apparatus is d.c. operated and is essentially a position indicating system in which the clock motors represent the receivers and the master clock the transmitter.

Stability of Turbo-Alternators

Power Factor and Voltage Control

IN view of the distances over which the outputs of large steam-electric stations are transmitted at high voltage, turbo-alternators are increasingly operated at high or even leading power factors.

In a paper recently presented before the American Institute of Electrical Engineers, Messrs. C. G. Adams and J. B. McClure said that turbo-alternators built during the past twenty years provided sufficient leading reactive capability to meet most system conditions found in practice while maintaining adequate steady-state stability margins. Voltage regulator control with an automatic lower limit had been found to permit a greater utilization of leading reactive capability than did manual control of excitation.

Of primary importance in system operation was the ability of the component parts to stand up to emergencies. Generators should respond quickly to changes in load, including those due to the opening of major tie lines. Determinations of load increases in emergencies should take into account limitations in boiler capacity, governor characteristics and the action of any load-limiting device controlling the prime-mover input. Excitation that would enable machines on manual control to pick up their share of load without loss of synchronism could thus be estimated.

A voltage regulator, adjusted to maintain rated voltage at the machine terminals, permitted operation close to the steady-state stability limit, and an alternator working in the unity or the leading power-factor regions would have small effect upon transient limits. With manual control, excitation should be sufficient to enable alternators to accept their load increment with stability after the transient phase was over.

Views on the News

Reflections on Current Topics

THE collection of purchase tax constantly provides the Customs and Excise Department with tricky problems. Faced with still further reduced sales of domestic electric fires as a result of the increase from 75 to 100 per cent in the purchase tax, some manufacturers are, I see, now offering reflector fires complete with chains for use in poultry and pig rearing, etc. The apparatus is admirable for the purpose and coming under the category of farming equipment is tax free. Far be it from me to suggest ways of avoiding taxation but I cannot see what is to stop anyone from buying the apparatus and easily converting it for domestic use. Probably the only way of eliminating all these difficulties is to abandon the tax altogether.

* * *

A great deal of information was conveyed quickly and concisely in the papers presented last week by younger members (two of them graduates) from the four Local Centre groups of the I.E.E. Installations Section. The wide field covered was shown by the subjects chosen, viz.: Aircraft (M. J. Cronin), lighting of power stations (V. Haydon), hazardous atmospheres (F. H. Merrill) and motor design fundamentals (J. Sykes). Too much, it seemed to me, was owed to a few in the discussions, but having regard to the necessary time limit this was possibly unavoidable. In view of the growing diversity of interests for which the Institution has to cater and the need for close association between London and the Centres, the precedent set seems to have possibilities of extension in a number of other ways.

* * *

Edinburgh has been privileged on several occasions to surmount the ban on floodlighting and has been allowed to illuminate the Castle, the Scott Monument and other landmarks of the city. The fittings were apparently the property of the Electricity Department for they have been taken over by the South East Scotland Electricity Board. Now the Corporation wants them back and the general opinion of the members is that it will have to buy them from the Board. One member suggested at a recent meeting that the Corporation should merely offer "scrap value" as the fittings would be of no use to the Board. I may be anticipating when I suggest that it would be a graceful gesture on the Board's part to return them without payment—or would that be contrary to the Electricity Act ?

* * *

How far professional predilections influenced my judgment in favour of Mrs. Grace Wheatley's picture entitled "Cogging Mill, Kilnhurst Steel Works" I cannot say, but it claimed my attention more than any other at the Royal Academy except one. That one was Sir Gerald Kelly's striking portrait of Dame Caroline Haslett, which many of her friends in the electrical industry may, however, consider to have caught a more austere mood than they have found typical.

* * *

In a recent talk in the European Service of the B.B.C. Clifford Tooke mentioned that in spite of the mechanization of industry it was still possible to observe "prehistoric" methods in use. At one factory which he visited, he was shown many examples of labour-saving machinery but he saw through a doorway into a yard men carrying heavy sacks on their backs in the time-honoured way. His aim was to draw attention to the importance of and need for the Mechanical Handling Equipment Exhibition at Olympia in July at which the latest systems of lifting and carrying loads in works, docks and other places will be displayed.

* * *

A lady reader writes to the *South Wales Echo* saying: "As a housewife, I would like to point out that ever since the electricity department has gone over to nationalization, it now costs me 1s. 6d. per week more in the meter." Can it be that some meters are naturally sensitive to change of ownership ?

* * *

From the *Electrical World* (New York):—

"Use of electricity has divided the Amish Church in Pennsylvania. A 'modernist' faction now permits its members to use electricity for lighting but not for power. 'Fundamentalists' just won't use it."

—REFLECTOR.

Electricity Charges

Lord Citrine on Necessity for Increases

AT a general press conference on 6th May Lord Citrine, chairman of the British Electricity Authority who was supported by members and officials of the Authority and the chairmen of the fourteen Electricity Boards, explained the necessity for raising prices to domestic and other non-industrial consumers. That necessity arose from the increased cost of coal and much higher capital charges.

Lord Citrine said that there was an impression that the electricity supply industry at the date of nationalization was in a healthy financial state but examination showed that it was not. At the very first meeting between the Authority and the Board chairmen to discuss the future structure of the industry there was a unanimous opinion that charges would have to be increased to domestic and non-industrial consumers. Since then they had been considering how that could be achieved with the least hardship to the consumers, but they were all convinced that immediate consideration of the problem was essential to avoid a deficit on the first year's working.

It was proposed to approach the problem in two stages. First, they would make provision for those cases in which deficits had already arisen. Then they would attempt to overhaul the finances of the industry as a whole and put tariffs on a sounder basis. The Boards had been asked to examine the financial situation and submit budgets and suggestions for future arrangements. That must take some months and they could not wait and let deficits pile up.

He emphasized that at the moment they intended to deal only with those areas with known deficits; there was no suggestion of a general increase in charges. He was dealing with the matter generally; details of any increases would be given by the chairmen of the Boards at individual press conferences which would be held in the next week or so.

Cheapness of Electricity

Lord Citrine pointed out that while nearly everything had risen in price since 1939 electricity, on the whole, had not. For the country as a whole there had actually been a decrease in the price per unit paid by non-industrial consumers from 1·598d. in 1938-39 to 1·415d. in 1946-47. That had latterly been made possible in many cases by the using up of reserves and by industrial consumers bearing some of the higher price of coal through variation clauses in their contracts. Broadly, domestic supplies had been given at increasingly uneconomic prices. Since the end of the war domestic consumption had expanded considerably while industrial consumption had increased but slightly and this had worsened the financial position. On vesting day more than 150 undertakings were operating under conditions which, if allowed to continue, would have resulted in an aggregate deficit of nearly £7 million in 1948-49.

Therefore the B.E.A. had decided that charges must be adjusted in towns and districts for which deficits in 1948-49 had been forecast. The amount of the adjustments would vary according to local circumstances. At the same time consideration would be given to the high flat-rate charge prevailing in some areas and all prices in excess of 6d. a unit would be reviewed with the idea of reducing them.

Board Chairmen's Statements

At a meeting of the **Southern Electricity Board** on 4th May at Maidenhead, the chairman (Mr. H. Nimmo) outlined the policy adopted for supplying electricity in the second largest Area of the B.E.A., which covers 6,500 sq miles (extending from Chiswick to Portland Bill) and has a population of over three million. The Board, he said, was responsible for supplying 800,000 consumers formerly served by twenty-two local authorities and twenty-six companies and bringing in an annual revenue of £14 million.

Mr. Nimmo explained the arrangements made for the administration of the Area, and went on to say that in view of the great increase in the various costs making up the price of electricity, which remained nevertheless at about the pre-war average of 1d. per kWh, the Board would have to adjust tariffs where electricity was now sold at a loss. Selling price would be related to the cost of energy bought in bulk from the Central Authority, in which coal was a major factor. Present differences between urban and rural tariffs would be lessened ultimately, but the first task was to secure an approach to uniformity in methods of charge.

In the Southern Area, it was stated by Mr. R. H. Coates, the B.E.A. divisional controller, there were eight main power stations, including that now being built at Poole, and fifteen smaller ones. These gave bulk supplies to the Area Board as the distribution authority and to the Southern Railway.

In Bristol last Friday Mr. S. F. Steward, chairman of the **South Western Electricity Board,** re-stated the case for an increase in prices. He said that with charges and conditions in the South Western Area remaining as they were at 1st April the local authority undertakings in the Area would have incurred a loss of about £366,000 in the current year; Bristol alone would have had a loss of about £200,000. Thus the Board had decided to raise the running charge of the domestic two-part tariffs in such

districts wherever this was less than 0·75d. per kWh. It was estimated that this would produce an increase in revenue of £250,000, leaving £116,000 under-recovered.

At the same time, as the first step in giving fair treatment to all classes of consumer it was proposed to reduce all flat-rate tariffs to 7d. per kWh where they were at present above that figure, or 8d. where the supply was given through a prepayment meter.

Schedules issued at the meeting showed that the present standing charges and the methods of calculating them are to remain unaltered. The increases affect Plympton, Plymouth, Bridport, Torquay, Bristol, Exeter, Taunton, Tiverton and Bath. In some cases the running charge is increased by as much as 50 per cent. At Taunton the distinction between inner and outer areas is abolished. About twenty districts will have reduced lighting flat rates.

Mr. Norman Elliott, chairman of the **South Eastern Electricity Board** has announced that his Board will make no immediate general increase in charges. It is hoped that economies resulting from reorganization will enable increases to be avoided.

The **North Eastern Electricity Board** (chairman, Mr. H. H. Mullens) does not propose to increase charges. The matter will be reconsidered when the results of the national survey and more detailed local investigation are available.

New Zealand's Industrial Future

Restrictions on Factory Building

AN important statement regarding New Zealand's factory extension programme has been made by Mr. Nordmeyer, Minister of Industries and Commerce of the Dominion. Expressing the opinion that it may be wise for New Zealand not to encourage further manufacturing enterprises at present because of the shortage of labour and materials, he has told the Manufacturers' Federation at Auckland that manufacturers should consolidate their present resources and plan wisely for the future.

To some extent, he said, industry had outstripped the Dominion's man-power resources, and while immigration was assisting at present, it would not be until 1952 that the effects of low birth-rate and the depression would be overcome. Mr. Nordmeyer emphasized that until the housing shortage had been overcome factory building would not be permitted except for repairs. He added that the question of withdrawing the protection offered to certain industries by the provisions of the Industrial Efficiency Act was being considered, and warned the Federation that the high rate of imports last year (totalling £120,000,000) could not be maintained because of New Zealand's agreement to live within her means and not to spend sterling reserves.

Insufficient Generating Plant

Another possible reason for checking any excessive development of factory industries in the near future is that although power supplies in New Zealand have improved slightly, generating facilities are still insufficient to satisfy a growing demand. At the end of 1947 control of consumption remained in force in most areas and conditions then indicated that there would be a power shortage until 1949. Representatives of the New Zealand Government have been in the United States and Canada with a view to obtaining plant and an official purchasing mission for unspecified commodities has arrived in London.

In the Dominion there are twelve manufacturers or assembling units engaged in producing domestic refrigerators and ten making domestic washing machines. The estimate of production in 1947 was 10,000 refrigerators and 15,000 washing machines. The United Kingdom Manufacturers' and New Zealand Representatives' Association recently noted that the quality of locally made electrical appliances was rapidly improving and therefore only British appliances of high quality were acceptable in the Dominion. It may be recalled that a New Zealand manufacturer secured a substantial measure of protection for certain small sizes of flex and radio cable. The Association announced its intention of trying to limit the extent of this protection. Prospects of success by the Association in this effort should be improved in view of Mr. Nordmeyer's statement.

I.E.E. Radio Section

ON 5th May the Radio Section of the Institution of Electrical Engineers held its first soirée at the Institution. After a reception by the chairman (Mr. C. E. Strong, O.B.E.) and Mrs. Strong there was a film display ("Radar Goes to Sea"). The other attractions were a demonstration of room-to-room television in which the members and guests were invited to take part; picture-telegraphy reception and high-speed telegraphy; a magnetic tape recorder which was used for recording and reproducing members' voices; a radar simulator; a working model of a beam-aerial system; and a demonstration of an army-type "Walkie-Talkie" equipment—also used by members.

Russian Railway Electrification.—A 400-km section of the Transcaucasian railway trunk line has now been electrified, and a further 600 km is to be converted under the Russian post-war five-year plan.

I.E.E. Annual Report

Membership and Attendance at Meetings

AT the seventy-ninth annual general meeting of the Institution of Electrical Engineers held yesterday evening, the Council presented its report for the twelve months ended 31st March, 1948. Within that period the membership increased by 1,647 to 32,907, of whom 15,206 are corporate members. New subscription rates came into force on 1st January.

Meetings held in London and local centres numbered 1,202. Attendance at the thirteen ordinary meetings averaged 271. Joint meetings were held with the Physical Society and the Institution of Mechanical Engineers. For the Sections the number of meetings, average attendance and total membership were:—Installations, 8, 104, 2,562; Measurements, 11, 104 (excluding 1,756 at the "Servo" Convention), 1,503; Radio, 17, 150 (excluding the Scientific Radio Convention), 3,875; Transmission, 10, 154, 2,376.

Extension of Centres

The South Midland Centre was extended to take in Stoke-on-Trent area, and the North Western Centre to include parts of Derbyshire. Informal district meetings have been arranged for members not living in towns where meetings are normally held. A combined Installations and Transmission Group was formed at the South Midland Centre. The number of Students' Sections was brought up to fourteen by the formation of a new one in the East Midland Area. Overseas representatives of the Council have been appointed in Western Australia (Mr. F. C. Edmondson), Victoria and Tasmania (Mr. G. G. Jobbins), Transvaal (Mr. J. S. Trelease) and Burma (Mr. E. A. Logan).

Modifications in the bye-laws now permit the election of non-members of the Institution to honorary membership and of candidates abroad, with the backing of one corporate member and an overseas representative of the Council, to corporate membership. Codes of Practice published include two on "Abatement of Radio Interference," and one on "Model Forms of General Conditions of Contract" (jointly with the Institution of Mechanical Engineers) will shortly appear in final form. With the collaboration of the Institutions of Civil and Mechanical Engineers, a conference is to be held in London for a week from 4th October to which representatives of foreign professional institutions are to be invited.

Proposals of the Electrical Engineering Advisory Committee of the Ministry of Labour have been adopted by the Ministry. These relate to the allocation to non-Service candidates of a larger number of entries to universities, and to the availability for civil employment of non-Service students born before 1929 who graduated in 1948 with 1st and 2nd class honours. Regulations drawn up by the Committee on Radio Equipment for Civil Aircraft have been published as part of the requirements of the Air Registration Board.

A new edition of the examination regulations came into force last month. Technical colleges have been informed of the general conditions under which their relevant courses with certificates and diplomas will be acceptable. Better facilities for the training of craftsmen and technicians and of electrical officers for the Merchant Navy are under consideration.

During the year the number of library readers amounted to 8,700, of whom 1,100 were non-members. A new edition of the list of corporate members and companions will be available within the next few weeks. The appointment of Mr. F. Jervis Smith as deputy secretary is recorded.

The Benevolent Fund was transferred to an incorporated body on 20th November. From 1st January to that date the income reached £8,382. Grants amounting to £4,163 were made to eighty-four persons. Approximately £1,100 was recovered from the Commissioners of Inland Revenue as a result of covenants to subscribe for seven years. An appeal is made for further similar covenants for the Benevolent Fund and for the Homes Fund, for which subscriptions and domations have amounted to over £20,000. The amount required within the next two years or so, when building on the Chesters Estate will begin, is £50,000. On 31st December, 1947, the capital of the Lord Hirst Fund stood at £12,643, which is invested to produce about £360 annually, and the balance to the credit of income account was £406.

Students' Swiss Tour

AT a conference of honorary secretaries o Students' Sections of the Institution of Electrical Engineers held recently in London it was decided to try to arrange a students' tour to Switzerland, probably from 14th to 29th August. The tour will include visits to a variety of electrical engineering plants, in such places as Zurich, Lucerne, Interlaken, Andermatt and Berne. The detailed itinerary is now being agreed with the Association Suisse des Electriciens.

Students interested in joining the party, numbers for which may have to be limited, should inform Mr. F. E. M. Hardy, 153, Gloucester Road, London, S.W.7 (Tel. Freemantle 3279), a member of the Sub-Committee of the London Students' Section who is arranging the tour, as soon as possible. The estimated inclusive cost is expected to be in the region of £35, but it may be possible to reduce this.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

D.C. Transmission

IN your leading article of 9th April, you discussed the possibility of d.c. transmission between Leigh Creek and Adelaide. This proposal, which is naturally of deep interest to us, has been considered and discarded in favour of generation at Port Augusta, approximately 160 miles from Leigh Creek and 200 miles from Adelaide, with a.c. transmission at 132 kV between Port Augusta and Adelaide, for several reasons. The most important of these is the lack of any satisfactory supply of water, either for boiler-feed makeup or for cooling purposes at Leigh Creek.

We have toyed with the idea of gas turbines, but do not consider the art sufficiently advanced, as yet, to risk a major installation 12,000 miles from any British manufacturers who would consider supplying such plant.

At Port Augusta, which can be reached from Leigh Creek without suffering from that handicap to all Australian transport, a break of gauge, there is sea water for cooling purposes and a plentiful supply of good fresh water pumped from the River Murray, as the result of the installation some years ago by the South Australian Government of a pipeline from the Murray through Port Augusta to Whyalla. Port Augusta is the nearest point on the sea coast to Leigh Creek and has also the advantage of this fresh-water supply. A thorough economic investigation showed that the installation of a plant here offered substantial advantages over any other practical proposal for the use of Leigh Creek coal.

Transmission on the d.c. system hardly came into the picture between Port Augusta and Adelaide, as the line will have to be tapped at several points for intermediate supplies. Transmission will be effected over two independent single-circuit 132-kV lines, both of which will pass through Port Pirie, approximately 50 miles south of Port Augusta, where a load of the order of 10,000 kW, with considerable potentialities, is available. From here the two lines fork, the western coming near the coast and being provided with a substation, stepping down to 33 kV, approximately half way to Adelaide, which will provide electricity for Yorke Peninsula and also to our existing transmission system, while the eastern line will be tapped at a point convenient for supply to the irrigation areas on the River Murray.

The whole scheme has only recently been authorized and preliminary work will shortly be begun on the power station site near Port Augusta, while tenders will be called for the boiler and turbine plant for which Messrs. Preece, Cardew & Rider are our London consultants.

R. H. M. LEA,
Chief Engineer and Manager.
Electricity Trust of South Australia.

Adelaide.

Sales Conference Lunch

THE E.D.A. sales management conference concluded on Friday last with an informal lunch at the Connaught Rooms, London. Mr. J. Eccles, chairman of E.D.A., was present and paid tribute to the work of Mr. V. W. Dale, general manager and secretary, and his staff in organizing the conference, especially at a time when the future of the Association had been so uncertain. He also thanked the speakers who had contributed to the success of the conference.

There had been misgivings about the new "set-up" for the electricity supply industry, but in the event things were not so bad. The commercial side of the industry ranked as high as other sections, and the Area Boards depended on the ability of those engaged in both the engineering and commercial sides to make it a success. Referring to the development of the industry, Mr. Eccles said that coal was no longer a problem, but the sales engineer would have to show consumers how to get the best use from their electricity supply and encourage them to spread the load until the plant situation improved. The consumer was purchasing a service and the sales engineer should keep this in mind when approaching the consumer. The future of those engaged in the industry was assured, but it must be remembered that the Area Boards had only been in commercial operation for a month, and it might be some time before individuals knew what their places would be. The future of the country depended almost entirely on the future of the electricity supply industry, and it was up to all those engaged in it to pull their weight. The new organization did not want to become a machine, and he hoped that members of the industry would find time to develop the cultural side of life.

Mr. Ashworth proposed a vote of thanks to Mr. Dale and his staff for the success of the conference, to which Mr. Dale responded.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Minister of Fuel and Power announces that **Mr. D. Bellamy** has tendered his resignation from the post of deputy chairman of the Yorkshire Electricity Board. Mr. Bellamy, who has had a long association with Hull, where he was formerly general manager of the electricity undertaking, does not wish to sever his connections there. He has been offered and proposes to accept an appointment as sub-area manager at Hull under the Yorkshire Electricity Board. The Minister has appointed **Mr. F. Newey, M.I.E.E.**, formerly city electrical engineer and manager to the Lincoln Corporation Electricity Department, to succeed him as deputy chairman of the Yorkshire Board, as from 1st May.

Mr. R. C. Pilsbury, B.SC., M.I.E.E., has been appointed managing director of the General Cable Manufacturing Co., Ltd., in place of Mr. **Reginald Woods**, who has tendered his resignation. Mr. Pilsbury served with the County of London group of electricity undertakings from 1921 to 1940, during which time he was engineer of the Richmond (Surrey) Electric Light & Power Co., Ltd., and later chief engineer of the Bournemouth & Poole Electric Supply Co. and its subsidiary companies. In 1936 he was appointed purchasing manager of the County of London group and continued in that capacity until 1941, when he was invited to join the Ministry of Supply to set up and control a Government organization which was made responsible for meeting the country's cable requirements at a critical stage in the war. He was appointed chairman of the Cable Planning Organization, Ministry of Supply, and occupied that position until the end of the war. Subsequently, Mr. Pilsbury joined Balfour, Beatty & Co., Ltd., and has been engaged on special technical work in the areas of the Lancashire and Scottish Power Companies.

Mr. R. C. Pilsbury

Mr. R. M. Parry, managing director of the British Driver-Harris Co., Ltd., has been elected to the board of the Irish Driver-Harris Co., Ltd., Dublin.

At the Royal Academy Summer Show at Burlington House, the exhibits include a bust of **Mr. W. J. Darby**, managing director of Lewis Berger & Sons, Ltd., sculptured by E. Whitney Smith. Mr. Darby, who has been on a tour of South Africa and Australia, is due back in this country at the end of the month.

Mr. C. M. Nesbitt, general sales manager of Dorman & Smith, Ltd., and its associate company DS Plugs, Ltd. who has just returned from a world business tour, has now been appointed a director of both companies.

Mr. C. T. Morrall, who was for many years associated with International Combustion, Ltd., and for the past few years has been general manager of Autocontrol Boilers, Ltd., has now joined Frederick Kay (Engrg.), Ltd., London, as director of sales.

Mr. E. H. Ball has been appointed to the board of the Metropolitan-Vickers Electrical Co., Ltd. Mr. Ball is managing director of the British Thomson-Houston Co. Ltd.

Mr. E. H. Ball

It is customary to expect a high standard at the periodical display of art and craftsmanship held by members of the head office staff of **W. T. Henley's Telegraph Works Co., Ltd.** This year's show maintained that standard, thanks largely (on the art side) to the "regulars" including Messrs. J. Dunford Smith and A. S. Brewer, who again won the judge's commendation. Messrs. A. Butterfield and C. T. Baggott and several others contributed to a very fine collection. The photographic section, too, contained some outstanding examples of scenic and portrait work, several by Messrs. H. S. Henley and O R. Heath. Among the handicraft exhibits were clever contributions in wood, metal, leather and textiles and there were also some particularly good models. Mr. Richard Garbe, **R.A.**, judged the fine art exhibits, Mr. George Smyth the photographs, Miss M. Colam the needlework and Mrs. L. Evans the leatherwork.

Mr. Harry Hill, manager of the B.I. Callender's Erith Works, retired on 30th April, and has been presented with a television receiver by the staff and with a wrist watch and a table petrol lighter from the workpeople. Mr. Hill joined the estimating staff of Callender's in 1906 and became manager of the Cable Department in 1918. In 1926 he went to America to help found the Callender-Okonite Co. and he was appointed joint works manager at Erith in 1931 and works manager in 1940.

The Wholesale Fittings Co., Ltd., held a fiftieth anniversary dinner on 8th May which was followed by a visit to a West End theatre. Mr. J. Altman, chairman and founder of the

company, presided at the dinner and gave a résumé of the company's progress from its inception. Mr. S. Rose, director, proposed a vote of thanks to the chairman supported by Mr. S. Posner (representing the company's provincial branches).

Obituary

Mr. M. Whitgift.—Members of the Batti-Wallahs' Society will learn with regret of the death, on 7th May at Epsom County Hospital, of Mr. Mark Whitgift, M.I.E.E., who had been hon. secretary of the Society since 1921. The "Mate," as Mr. Whitgift was known by Batti-Wallahs, was largely responsible for the popularity of the Society's monthly luncheons and many prominent personalities from all walks of life have spoke at these functions at his invitation. Mr. Whitgift had been development officer with the London and Home Counties J.E.A. since 1934 and was due to retire. He was a member of the Surrey Committee of the National Register of Electrical Installation Contractors and founder of the Association of Old Cromptonians. He was also a founder-member of the Electrical Association for Women and was on the L.C.C. Committee of the City Literary Institute. He was sixty-four years of age.

Mr. A. W. Bennis.—We regret to report the death on May 4th of Mr. Alfred William Bennis, M.I.MECH.E., ASSOCIATE I.E.E., M.INST.F., chairman and managing director of Bennis Combustion, Ltd.

South African Planning

Need for Vigorous Electricity Policy

(From our Capetown Correspondent)

DRASTIC curtailment of the present powers of the Electricity Supply Commission is entailed in the Social and Economic Planning Council's proposals for greatly expanding the electrification of South Africa. The Planning Council finds an "urgent need for a vigorous expansion of electricity supply throughout the Union," and considers the present electrification of the Union hardly satisfactory by international standards. In almost every other form of public works, it declares, there is already a suitable organization to plan for expansion. In the case of electrification, however, the absence of an effective central promoting and controlling body makes genuine planning impossible.

It therefore suggests that certain powers, vested for many years past in the Electricity Supply Commission should be transferred to the Electricity Control Board, to enable the Board to carry out a comprehensive investigation of all possible means for expanding the use of electricity throughout the Union. It points out that under the Electricity Act of 1922 the Electricity Control Board is the controlling body, but, for reasons not known to the Council, the Electricity Supply Commission has been given investigatory and advisory functions which would seem more properly to belong to the controlling body.

First, the Act directs the Commission to investigate the question of the establishment or acquisition of electricity undertakings. If the Commission decides that it should establish or acquire any such undertaking, it must ask the Control Board for the necessary licence. Secondly, if the Commission does operate an electricity undertaking the users of not less than two-thirds of its output of power are entitled to tell the Minister after five years that the undertaking could better be taken over and/or worked by some other body. If they do, the Act obliges the Commission to call publicly for tenders for the ownership and operation of the undertaking. The Commission must, however, report to the Minister whether it considers it to be in the public interest for any such tender to be accepted. "Thus," says the Planning Council, "the Commission, which is the only body possessing the necessary investigatory powers, is charged with the duty of recommending whether the undertaking concerned should be owned or operated by other bodies or by the Commission."

In view of the great need for cheap electric power all over South Africa, the Planning Council wants to see in existence "a dynamic development authority" to explore all possibilities, including rural electrification, railway electrification and hydro-electric power. The powers of the existing Electricity Control Board, however, do not include what is wanted for the purpose, namely, the investigatory and co-ordinating powers at present vested in the Electricity Supply Commission. On the other hand, the Commission "may be embarrassed by the fact that it is an interested party," the Council comments. Moreover, it must operate neither at a profit nor at a loss and must keep separate accounts for each of its electricity undertakings. A comprehensive power survey would involve expenditure which could not be fairly allocated to the Commission's existing consumers.

The Planning Council therefore considers that the Electricity Control Board should be reconstituted into a new body having functions similar to those of the Electricity Commissioners in Great Britain. While retaining its present functions, it should take over the investigation, direction and co-ordinating powers which at present belong to the Commission.

PARLIAMENTARY NEWS

By Our Special Reporter

LAST week in the House of Commons the Minister of Fuel and Power (Mr. Gaitskell) informed Mr. Erroll that because of the oil supply situation it would not be possible at present for all the postponed coal-oil conversion schemes to come into operation, and in the majority of cases the firms concerned must continue to burn coal, probably for some considerable time to come. The only exceptions would be schemes of conversion which had exceptional economic merit.

Mr. Erroll asked the Minister if he could give a guarantee that existing consumers of fuel oil would get their fuel supply and if he could make any statement about the oil firing of Bankside power station.

Mr. Gaitskell said he thought there would be sufficient oil for those firms which had already converted, and it was because they wanted them to have enough oil that they had deferred other schemes. He had no statement to make on the Bankside power station. The Government could not admit any claims for compensation. The conversion was voluntary, though he agreed the Government gave it encouragement.

Electricity Commissioners' Staff

In the course of a reply to Mr. Erroll, Mr. Robens, Parliamentary Secretary to the Ministry of Fuel and Power said that under the Electricity Act, the Electricity Commissioners would be dissolved and their functions would be divided between the Ministry and the British Electricity Authority. Approximately 80 of the Commission's staff would be transferred to the Ministry and the remaining 40 to the British Electricity Authority.

Consultative Councils

Mr. Gaitskell told Mr. Palmer that he hoped to be able to announce the names of the chairmen of the Area Consultative Councils very soon. As regarded the members, he had not yet received the views of all those whom he was required by the Act to consult before making these appointments, but he hoped to complete the list within a few weeks.

Mrs. Paton asked if the Minister would see that women were appointed to the Consultative Councils, and Mr. Gaitskell said he would bear that point in mind.

Hearing Aids

Mr. Erroll asked the Minister of Health what provision he intended to make for persons who found the Government "Medresco" aid unsuitable for their form of deafness.

Mr. Bevan said that the Electro-acoustics Committee of the Medical Research Council was planning research in connection with a hearing aid for the very small proportion of patients for whom the "Medresco" aid was found not wholly suitable.

Rural Supplies

In a supplementary question Col. Clarke asked the Minister of Fuel and Power if he recollected that before nationalization an arrangement had been made between the National Farmers' Union and the electricity companies whereby rural electricity supplies could be clearly accelerated.

Mr. Gaitskell said he knew of no such arrangement.

Electrical Equipment In Houses

Mr. Piratin asked the Minister of Health whether he would grant authority to local authorities to meet the cost of conversion of wireless sets and other electrical equipment of rehoused families, many of whom had been removed from their former homes by the local authorities by compulsory order.

Mr. Bevan said he had no power to authorize this expenditure and he did not propose to ask the House for legislation.

Case for District Heating

Reliability the First Need

DISTRICT heating, with special reference to the combined generation of heat and electricity, was the subject of a paper read recently by MR. H. S. HORSMAN (London Power Co.) at the Royal Society of Arts.

The author claims that a case has been made out for district heating in this country. His paper first sets out the advantages to be derived from the distribution of hot water from a central source to surrounding buildings, and includes a tabulated estimate of the savings in coal that might result from improvement of domestic heating methods.

The paper then briefly describes a typical district heating system, indicating the broad principles of combined generation, which is assumed to be capable of saving from 25 to 35 per cent of the fuel needed for separate generation. Contrary to popular opinion, the heat losses would not be large, usually less than 11 per cent of the maximum hourly demand for heat with an annual loss of less than 20 per cent.

The second half of the paper consists of comment on the design, construction, operation, maintenance and management of an extensive system of this kind. Success will depend upon reliability in service and for this reason, economic considerations relating to the construction of such a system must be of secondary importance.

E.T.U. Conference

Executive Committee's Report for 1947

NEGOTIATIONS on wages and conditions of electricians in many branches of industry form the principal subject of the Executive Council's report to the second annual delegate conference of the Electrical Trades Union held at Great Yarmouth this week.

The Executive Council states in the course of the report that the number of branches increased during 1947 by 38, raising the total to 523. Membership increased by 8,198 to 170,141 of which the skilled section represented 53 per cent, auxiliary membership 25 per cent and apprentice members 14 per cent. There had been a small decline (to 6,303) in the female membership.

The Union is represented on the National Committee on Statutory Wiring Regulations and Registration, and following the report on the subject issued under the auspices of the I.E.E. it expressed the opinion that the National Committee, instead of sponsoring compulsory registration should press the Government and the British Electricity Authority to introduce statutory measures for ensuring proper standards of wiring, designs of apparatus and a sufficiency of inspection of installations. Motions were to be put forward on Wednesday at the conference calling (*a*) for the registration by law of operatives and contractors, and (*b*) for Governmental registration of all operatives.

The report deals with the Union's activities in the nationalization of electricity supply and it is stated that the Committee appointed to deal with the subject was told by the Minister of Fuel and Power that while he agreed with the Union's aim to secure representation in respect of conciliation machinery he could not accept representation in respect of management. He promised, however, to appoint a proportion of persons with trade union experience to the Electricity Boards. It is noted that three members—Lord Citrine, Mr. E. W. Bussey and Alderman W. Lewis—have been appointed to the British Electricity Authority.

In another section of the report, on the control of industry, it is said that there is a great deal of disquiet in the trade union movement at the appointments made to the boards of nationalized industries.

Upon the subject of the economic crisis reference is made to resolutions passed last September in which means for dealing with the crisis were suggested, including the operation of a national economic plan, price control, limitation of profits, reduction of the armed forces and the nationalization of the iron and steel industries.

As regards payment by results, the report records amendments to the Union's rules made last year providing for the operation of payment-by-results systems approved by the Executive Council and safeguarding members' interests.

In his address to the conference on Monday Mr. Frank Foulkes, the president, referred to a "campaign" to discredit duly-elected trade union officials whose political affiliations did not coincide with those of the Labour Party. He denied that there had been any "infiltration" into the E.T.U.; its officials were all apprentice-trained craftsmen elected without regard to their politics.

The Union's executive had voted against acceptance of the Government's "wage-freezing" policy. They were willing to share any sacrifices to ensure the community's well-being but profits were still too high. The Union's leaders advocated an overall economic plan with clear-cut priorities and power to enforce planning decisions at every level.

The Union is continuing to press for adequate State facilities for the education and training of apprentices.

Mr. E. W. Bussey (B.E.A.) was to address the delegates on Wednesday, and Mr. Hugh Gaitskell (Minister of Fuel and Power) is the principal speaker at a luncheon to-day (Friday).

Australian Electrical Trade

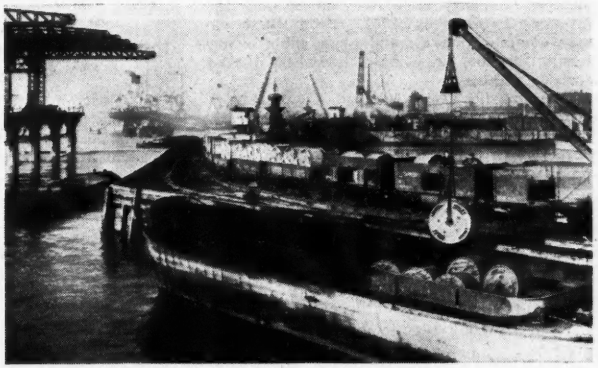
DURING the six months ended December last Australian imports of electrical appliances and equipment totalled £A4,305,000 in value compared with £A2,516,000 during the corresponding period of 1946. The total was made up as follows:—Batteries and accumulators £43,000 (£110,000), covered cable and wire £477,000 (£323,000), dynamo-electric machines £824,000 (£438,000), filament lamps £184,000 (£88,000), telephone and telephone instruments £617,000 (£579,000), and unspecified electrical machinery and appliances £2,160,000 (£978,000). During the same period exports of electrical appliances and equipment were valued at £567,000 compared with £412,000 during the last six months of 1946.

There is an increasing demand for electric wire and cable, both for industry and housing. Orders have accumulated for thousands of new telephones. The mechanization of coal-mining calls for insulated cables for drills and other equipment. Until 1940 all insulated wires and cables had to be imported. Now it is claimed that all but a few specialized types are made locally and that there is a big demand for Australian-made wire and cables for export. More than a thousand different types of insulated wire are said to be manufactured in the Commonwealth.

COMMERCE and INDUSTRY

Telephone Cable for Turkey. Analysis of Earnings.

SOME months ago the Turkish Post, Telegraph and Telephone Department signed a contract for the supply of telephone cables to the value of approximately £250,000. The contract was placed with W. T. Henley's Telegraph Works Co., Ltd., and the final value will be approximately £300,000. Large deliveries have already been made. The order comprises 372,165 metres of star quad dry core underground telephone cables manufactured in accordance with British Post Office specification and to be supplied in sizes ranging from 6 to 600 pairs. In addition, there is an item of 4,000 metres of rayon insulated lead sheathed indoor telephone cable. These cables are being used by the Turkish authorities in connection with telephone development schemes being carried out at Istanbul, Ankara and Izmir, and the contract is one of the largest for electric cables ever placed with a British firm by these authorities. G. & A. Baker, Ltd., of Istanbul, have acted for Henley's in handling the negotiations which resulted in this contract. In the accompanying picture we show a consignment of the cables being shipped.



Henley telephone cables being shipped to Turkey

Standard Specifications

Former specifications for copper for winding electrical machines have been superseded by BS.1432 for sheet and strip, BS.1433 for bar and rod, BS.1434 for commutator bars. These have been rearranged in a more logical sequence and their scope modified to conform with the recent BS.1420 for wrought products.

The sound insulation of houses, flats and schools is dealt with in Code of Practice CP.3—Chapter III (1948), including constructional and other methods of noise abatement, nuisance assessment and loudness data.

These documents are obtainable at 2s. each from the British Standards Institution, 28, Victoria Street, London, S.W.1.

Building Work Measurement

After an interval of over twelve years, the "Standard Method of Measurement of Building Works" has appeared in a fourth edition. It has been produced by a Standing Joint Committee representing the Royal Institution of Chartered Surveyors and the National Federation of Building Trades Employers (Sicilian House, Sicilian Avenue, Southampton Row, London, W.C.1) and is priced at 10s.

For the first time, in co-operation with the Electrical Contractors' Association, an electrical section appears in the Standard Method. This covers the methods of specifying and measuring heavy plant and equipment, control gear, cables and flexibles, conduits, lamps, ducts, etc., poles for overhead lines, wall brackets, insulators, lightning arrestors, guard and bearer wires, telephones, bells, clocks, etc., earthing and testing.

Another section of electrical interest is that covering the heating and ventilating engineer. This deals with boilers and calorifiers, pumps and motors and their wiring and switchgear, radiators, ventilators, fans and allied equipment.

Patents in Pakistan

A Patents and Designs Office has been set up by the Pakistan Government and until a controller is appointed applications should be addressed to Mr. S. M. Ahmed, Examiner of Patents and Designs, c/o the Ministry of Commerce, Industries and Works, Chief Court Building, Karachi, Pakistan.

N.P.L. and Industrial Organizations

From 2.30 to 6.0 p.m. on 21st June, the National Physical Laboratory at Teddington is holding an "Open Day" to which representatives of industrial organizations are being invited. The wide range of scientific research and investigational work undertaken at this establishment is already well known to industry but there may still be a large number of firms

with whom the N.P.L. has no contact. Some of these will undoubtedly wish to take this opportunity of seeing the scope of the Laboratory's activities and a number of invitations are being reserved for this purpose. Accredited representatives of industrial organizations interested in the work of the Laboratory are invited to apply to the Director, National Physical Laboratory, Teddington, Middlesex not later than 5th June.

Hours and Wages

Particulars are published in the April *Ministry of Labour Gazette* of hours and wages in industry and trade during the last pay-week in October, 1947. From these we have compiled the accompanying table giving details for the four main branches of the electrical industry.

The statistics were derived from returns covering a substantial proportion of each branch; they do not cover the whole of the workers. In the case of women two part-time workers are regarded as one full-time worker. Where no particulars are given in the table the number of workers concerned was too small to be of significance.

	Men	*Youths and Boys*	*Women*	*Girls*	*All Workers*
ELECTRICAL ENGINEERING—					
Nos. covered by returns	78,223	11,141	34,384	2,338	126,086
Av. weekly earnings	139s. 4d.	44s. 6d.	74s. 8d.	42s. 9d.	111s. 7d.
„ hours worked	46·5	42·8	41·1	41·4	44·6
„ hourly earnings	36·0d.	12·5d.	21·8d.	12·4d.	30·0d.
Per cent increase in hourly earnings since October, 1938	99	95	151	142	134
ELECTRICAL APPARATUS, CABLE, LAMPS, ETC.—					
Nos. covered by returns	69,873	5,676	56,649	4,935	137,133
Av. weekly earnings	133s. 9d.	47s. 4d.	72s. 11d.	43s. 10d.	101s. 10d.
„ hours worked	46·3	42·8	41·7	42·3	44·1
„ hourly earnings	34·7d.	13·3d.	21·0d.	12·4d.	27·7d.
Per cent increase in hourly earnings since October, 1938	99	71	122	127	120
ELECTRICAL WIRING AND CONTRACTING—					
Nos. covered by returns	5,792	2,703	115	13	8,623
Av. weekly earnings	130s. 10d.	38s. 4d.	—	—	100s. 10d.
„ hours worked	49·4	47·2	—	—	48·5
„ hourly earnings	31·8d.	9·7d.	—	—	24·9d.
Per cent increase in hourly earnings since October, 1938	66	83	—	—	78
ELECTRICITY SUPPLY—					
Nos. covered by returns	83,336	4,516	1,540	43	89,435
Av. weekly earnings	123s. 3d.	43s. 7d.	71s. 2d.	—	118s. 4d.
„ hours worked	46·9	44·4	39·0	—	46·7
„ hourly earnings	31·5d.	11·8d.	21·9d.	—	30·4d.
Per cent increase in hourly earnings since October, 1938	79	83	—	—	81

Public Address System at Singapore

One of the largest installations of public address and "paging" equipment in the Far East, has recently been completed by the General Electric Co., Ltd., at the Turf Club Stadium, Singapore. It comprises a three-unit amplifier, single-bay, rack assembly with gramophone player, a three-position control box and a series of microphones and loudspeakers, and the installation provides music relay and paging facilities through the grandstand and principal buildings. In addition, a separate amplifier, with its associated microphone and loudspeaker, is provided for paging purposes in the car park. The microphone for this subsidiary installation is located on the pavement outside the main entrance, and is also used by the police for traffic control.

Dissolution of Partnership

Messrs. J. G. Elvidge and J. E. Stockwell, carrying on business as electrical engineers at Randall House, Wincheap Street, Canterbury, as J. Elvidge, have dissolved partnership. Mr. Elvidge will attend to debts and carry on the business.

International Mechanical Engineering Congress

In connection with the Congrès International des Fabrications Mécaniques, which is being held in Paris from 13th to 18th September, the British Engineers' Association has now received copies of a brochure giving information on the salient points. This includes a programme of conferences and of visits to works in the Paris area. Copies of the brochure are obtainable from the Publications Division of the British Engineers' Association, 32, Victoria Street, London, S.W.1.

"Electricity Made Easy"

The series of charts ("Electricity Made Easy") originally designed before the war and issued by the Electrical Association for Women, 35, Grosvenor Place, London, S.W.1, has been revised. Chart No. 1 depicts generation showing coal being lifted into the bunker, and steam driving a turbine to work the generator.

Chart No. 2 illustrates transmission and distribution, showing how supply is brought to a farm, a factory, a village, and a town. Chart No. 3 is called "Electricity—the Circuit in the Home." The full-size charts using several colours, measuring 30 in. and 40 in., linen backed and suitable for wall hanging cost 6s. 6d. post free. In reprinting and revising it was decided to treat the transmission and distribution chart, and that on the house network in an entirely new way. A second series entitled "How It Works" illustrates the electric cooker, electric irons, the electric refrigerator and its mechnical unit, the vacuum cleaner and the electric washer.

Purchase Tax on Radio Apparatus

Reductions of purchase tax on radio apparatus are proposed in a series of amendments to the Finance Bill tabled by a group of Labour M.P.s, states the Parliamentary Correspondent of *The Times*. They suggest that the tax on radio sets and radio gramophones should be at the rate of 33⅓ per cent instead of 66⅔ per cent, and that television sets and parts, radio valves and cathode-ray tubes should be exempt from the tax.

Heating and Ventilating Engineers' Summer Meeting

The summer meeting of the Institution of Heating and Ventilating Engineers will be held at Bournemouth from 21st to 23rd June. The headquarters will be at the Burlington Hotel, Boscombe, and in addition to an interesting programme of social activities, a paper on "Heat Pump Principles and Applications," will be presented by Mr. J. H. Evans on the second day of the meeting, in the evening of which a banquet will be held at the Burlington Hotel.

Trade Publications

Liverpool Electric Cable Co., Ltd., Bootle, Liverpool, 20.—Folder describing a pressure type electric vulcanizer for the repair of mining cables.

Daly (Condensers), Ltd., West Lodge Works, The Green, Ealing, London, W.5.—Technical brochure on electrolytic capacitors for a.c. motor starting.

Sunvic Controls, Ltd., 10, Essex Street, Strand, London, W.C.2.—Priced leaflet on the electronic relay type EA2 for controlling load up to 2 kW.

Industrial Electrical Co., Ltd., Offord Street Works, Offord Road, London, N.1.—Priced catalogue of ex-Government motors, generators and control gear.

Britannia Batteries, Ltd.—Trafalgar House, 9, Great Newport Street, London, W.C.2—Technical brochure describing "Alklum" steel-alkaline batteries and associated equipment.

Reliance Manufacturing Co. (Southwark), Ltd., Sutherland Road, Higham Hill, Walthamstow, E.17.—A folder containing illustrations, dimensions and details of potentiometers.

Hellermann Electric Ltd., Goodtric Works, Brewer Street, Oxford.—Leaflet illustrating "Helvin" rubber sleeves, grummets, bushes, etc.

Bell and Call Systems

The Codes of Practice Committee has now issued as a draft Code 327,401 "Bell and Call Systems." The draft deals with the installation in temperate climates of electric bell and indication call systems, including time bells in private dwellings, hotels, schools and factories, and with burglar alarms and watchmen's supervisory services. Bells for fire alarms are not included. Recommendations are made for the laying and fixing of internal and external cabling and wiring, the provision of distribution and junction boxes, inspection, and testing and maintenance. An appendix contains information about segregation of circuits and reduction of electrical interference. Recommended types of cable, in addition to those included in British Standard Specifications, are listed. Comments are invited and should be submitted by 16th June.

Marine Radar

A booklet entitled "Marine Radar: Performance Standards," published for the Ministry of Transport (H.M. Stationery Office, 4d.) contains the new specification for general purpose equipment for ships, which supersedes all others issued in the U.K., including the 1946 requirements. The Ministry will in due course issue a "Certificate of Type-testing" and the booklet gives a list of recommended practices which, although not obligatory for the issue of a certificate, should be borne in mind when judging a particular radar set.

Guide for Employees

A useful booklet for new employees has been issued by Higgs Motors, Ltd. This contains not only the rules and conditions of employment with the company, but includes notes about the activities and growth of the organization.

International Welding Congress

By invitation of the Institut Belge de la Soudure, the inaugural meeting of a new international body, the International Institute of Welding, will be held in Brussels from 8th to 11th June next. It is expected that eighteen countries will be represented at this gathering and invitations have been sent to welding societies in all parts of the world, inviting them to send delegates to register their adherence to the Institute. The technical meetings will also be open to all who are interested in welding. Those intending to take part in the conference should communicate with

the secretary of the Provisional Committee, Mr. G. Parsloe, the Institute of Welding, 2, Buckingham Palace Gardens, London, S.W.1.

Lighting Course for Students

A course in illuminating engineering to qualify students for the Intermediate Grade of the City and Guilds examination in illuminating engineering, has been arranged in the Liverpool Area. Students should have gained the Ordinary National Certificate in Electrical Engineering, or the City and Guilds "B" Certificate in electrical installation work.

The course will comprise evening classes at the Bootle Technical College, beginning in September. Further details can be obtained from Mr. J. Cormack B.SC., M.I.E.E., principal of the College.

Indian Telephone Agreement

A fifteen-year agreement has been concluded between the Government of India and the Automatic Telephone & Electric Co., Ltd., for the development of telecommunications. Under the contract India receives patent licences for immediate assistance in the manufacture locally of telephone equipment of all kinds. While local manufacture is being progressively developed, the Government's requirements will be supplied exclusively from England.

B.I.F.—Correction

In the advance notes on the exhibits of the Simplex Electric Co. at the Birmingham Section of the British Industries Fair in our issue of 30th April, we stated that the company was showing washing machines. The company points out that no washing machine appears in its stand.

Trade Announcements

The Kersons Manufacturing Co., Ltd., Birmingham, announces that Mr. F. C. Fuke, M.I.E.E., has been appointed sales agent for the London District.

J. H. Tucker & Co., Ltd., Birmingham, have appointed Mr. A. J. Gardiner, A.M.I.E.E., as sales representative for the Midlands Area.

British Association

THIS year's annual meeting of the British Association for the Advancement of Science (the 110th) is to be held at Brighton from 8th to 15th September and the preliminary programme and registration forms are now available from the secretary at Burlington House, London, W.1. The president for 1947-48 is Sir Henry Tizard, K.C.B., F.R.S.; the president of Section A (Mathematics and Physics) is Sir Lawrence Bragg, O.B.E., F.R.S., and the president of Section G (Engineering) Wing Cdr. T. R. Cave-Browne-Cave, C.B.E.

Next Week's Events

Tuesday, 18th May

CAMBRIDGE. — Cambridgeshire Technical College, 6 p.m. I.E.E. Cambridge Radio Group. "Some Aspects of Gramophone Reproduction," by K. N. Hawke.

Wednesday, 19th May

DUBLIN.—Trinity College, 6 p.m. I.E.E. Irish Branch. Conversazione and visit of President.

LONDON.—Savoy Hotel, 12.30 for 1 p.m. Gauge and Tool Makers' Association. Quarterly luncheon. 2.30 p.m. Annual general meeting.

Friday, 21st May

BELFAST.—Queen's University, 6.45 p.m. I.E.E. Northern Ireland Centre. Conversazione and visit of President.

DUNDEE.—Training College Hall, Park Place, 7.30 p.m. I.E.E. Scottish Centre. Faraday Lecture. "Electricity and Everyman," by Dr. P. Dunsheath. A golf competition will be played in the afternoon at Carnoustie.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Measurements Section. "Great Personalities in the Fields of Electrical and Magnetic Measurements," by Prof. J. T. MacGregor-Morris.

Saturday, 22nd May

CAMBRIDGE.—Women's Engineering Society, London Branch. Visit to Cambridge Observatory and Laboratories.

LONDON.—Hyde Park Hotel, Knightsbridge, S.W.1, 7.30 p.m. Electrodepositors' Technical Society. Annual dance.

PITLOCHRY.—I.E.E. Scottish Centre. Excursion including a visit to the North of Scotland Hydro-Electric Board works.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month from 5th May:—

COMFORTRIC. No. 658,455. Class 7. Clothes-washing, dish-washing, ironing and food-mixing machines, all being electrically operated. —Manor-Lectric, Ltd., 23-25, Wood Street, Barnet, Herts.

VOXETTE. No. 658,310. Class 10. Electro-medical acoustic apparatus, hearing aids for the deaf, etc., and parts included in Class 10 of all such goods.—Amplivox, Ltd., Amplivox House, 2, Bentinck Street, Manchester Square, London, W.1.

DEFIANT. No. 656,815. Class 11. Fluorescent electric lamps.—Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester.

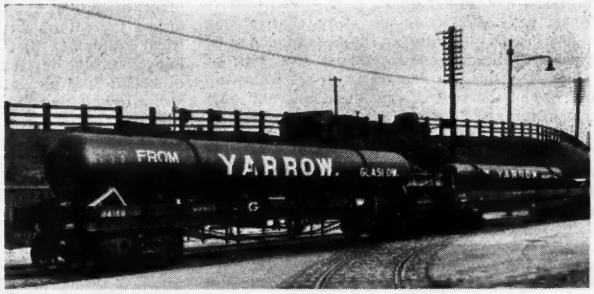
AUTOCAL. No. 658303. Class 14. Horological instruments. Smiths English Clocks, Ltd., Cricklewood Works, Edgware Road, N.W.2.

LONRAY. No. 658,656. Class 11. Electric water heaters and electric immersion heaters.—Santon, Ltd., Somerton, Newport, Mon.

ELECTRICITY SUPPLY

Boiler Drums for Hayle Station.

Cornwall.—Power Station Boiler Plant.—The accompanying picture shows a train of boiler drums leaving the works of Yarrow & Co., Ltd., Glasgow. These drums are for a boiler for the Hayle power station, Cornwall. Owing to the restricted access at site and to facilitate off-loading it was necessary to send the complete set of drums forward in one consignment. The boiler of which these drums will form a part is a stoker fired unit designed for a maximum continuous rating of 200,000 lb/hr, working pressure of 425 lb/sq in. and final steam temperature of 825 deg F. The contract is being carried out to the requirements of the consulting engineers, Ewbank & Partners, Ltd.



Yarrow boiler drums en route for Hayle power station, Cornwall

Overseas

France.—Increased Consumption.—Electricity consumption rose to about 26,800 million kWh in 1947, an increase of 13 per cent over the preceding year and 42 per cent over 1938. Despite the strikes in June, November and December, the objective assigned to the electrical industry by the Monnet plan was thus realized. Hydraulic production accounted for 56 per cent of the total.

Philippines. — Hydro-electric Development.—Following a survey of the Philippines a programme of power station construction and extensions has been recommended. Two of the proposed stations, Ambuklao (72,000 kW) and Itogon (86,000 kW) would utilize the waters of the Agno river in the Cordillera mountains, Luzon. Greater still are the resources of the Angus river, in Mindanao, which falls some 2,300 ft (700 m) in less than 24 miles (38·6 km). It is considered that there are at least seven sites suitable for hydro-electric development and it is recommended that a start should be made with one, at the Maria Cristina waterfall. Six 40,000-kW units are foreseen at this site but two units only are called for in the initial project. An integral part of the Maria Cristina hydro-electric development is the construction of a fertilizer factory to form a base load.

Switzerland. — Large Power Schemes. — Five large new hydro-electric power projects which will cost some £235 million are being planned in Switzerland for completion during the next eight years. They involve the construction of twelve dams and more than 50 sq km of artificial lakes to harness the water power of the high Alpine valleys above the Rhône and the Rhine. Together with fourteen smaller hydro-electric schemes they will increase Switzerland's output of electricity from 10,500 million to 19,200 million kWh a year, representing 70 per cent of the total exploitable hydro-electric energy in the country.

Overseas Water Power Projects.

Work has already started on one of the five new projects, the expansion of the Oberhasli group of reservoirs and power plants in the central Swiss Alps. At Oberhasli, two new reservoirs are being built in the upper Aare valley and at Ratherichsboden to serve three new power stations. The total annual output of the group will be raised to 1,627 million kWh. Of the four other schemes the biggest is that of the Grande Dixence, in the Alps, south of the Rhône, with a 5-km-long reservoir fed by the melting waters of thirty-three glaciers. Work will begin shortly on the Greina project in the Grisons, in which four power stations will be built to utilize the water collected in four reservoirs above Biasca and Olivone, producing a total of 1,820 million kWh a year. In the two final schemes (Spoel and Val di Lei) the drainage area and artificial lakes will be in Italy while the power stations will be on Swiss soil. For the Spoel project, the Livigno valley in Italy will be converted into a 10-km-long lake by a dam 125 m high across the Spoel gorge. Of the 935 million kWh produced annually a proportion will be exported to Italy. Considerable opposition to the plan has been aroused in Switzerland because the conduits leading to the underground power station at Zernez will have to be built across the Swiss National Park. The Val di Lei project, which forms part of the larger Hinterrhein plan, involves the construction of three new power stations.—*Reuter.*

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Associated Electrical Industries, Ltd., held its annual meeting on 5th May when the Rt. Hon. Oliver Lyttelton (chairman) said that the fuel crisis and interruptions in the flow of raw materials had added to the difficulties of 1947. It was with satisfaction, therefore, that he was able to record that during the year invoicing of finished products rose by 18 per cent, part of which was due to increase in prices following the rise in the cost of raw materials, and part due to increased volume made possible by their additional manufacturing capacity. They had been anxious to help employment in the Development Areas and good progress had been made with the new plants at Motherwell and Sunderland. At Motherwell they planned large-scale production of meters and X-ray apparatus. They also had new plants at Llandudno Junction and Hereford.

Referring to research, the chairman said that they could claim to be one of the few companies in the world that had a fundamental research department which was entirely divorced from applied research. It was at Aldermaston and was in the charge of Dr. T. E. Allibone. Turning to applied research, the magnet and auxiliary gear for the largest cyclotron which was to be installed at Liverpool University had recently been ordered by the Ministry of Supply from the Metropolitan-Vickers Electrical Co., Ltd., which was also supplying a 20-million electron-volt betatron to the Christie Hospital for cancer research. Notable advances had been made in the metallurgical field by Metropolitan-Vickers. The B.T.H. laboratory at Rugby had also been actively engaged on the particle accelerators of nuclear physics and during the year a new light-weight betatron, the first of its type to be made in this country, had been completed for Lord Cherwell's use at Oxford. In the electric lamp field the perfection of fluorescent powder had extended the improvement made last year in a "warm white" coloured lamp; the luminous output of the 80-W fluorescent lamp had been increased. Progress had also been made in the applications of the mercury cadmium lamp to film studios and of fluorescent lamps to street lighting and to mines. Developments were in hand regarding miniature radio sets which included a breast-pocket five-valve set weighing only 1 lb and having a receiving range of over 100 miles.

With regard to export trade, the total value of the group's shipments to all parts of the world in 1947 was £14 million, and since the close of the year they had made still further increases in their export business. At the end of 1947 firm orders on the books were the highest ever recorded in the history of the group, and the rate at which orders was being received was still increasing.

After referring to the group's overseas investments, the chairman spoke of the diversity of the business. During the past year they had continued to take further orders for generating plant at home and had received important orders for rolling mill motors and other electrical equipment for the steel industry. Regarding gas turbine development, the initial successes of radial-flow and axial-flow gas turbines on aircraft had been followed by others, and Metropolitan-Vickers gas turbines had been installed in a naval vessel and in a flying boat.

British Electric Traction Co., Ltd.—Revenue for the year ended 31st March last amounted to £1,206,288, compared with £823,261 for 1946-47. Taxation absorbs £472,000 (£305,005) and the balance after deducting expenses and debenture stock interest is £574,588 (£365,992). With an unchanged final dividend of 35 per cent the distribution on the deferred ordinary stock is maintained at 50 per cent for the year. On the 6 per cent participating preference stock the final dividend of 5 per cent makes 8 per cent for the year (same). A sum of £267,415 (£58,819) is transferred to undivided profits account.

Ever Ready Co. (Great Britain), Ltd.—Commenting on the accounts for the eleven months to the end of February, the chairman says that the recovery in business was achieved by record production and sales in the home and export markets. This was made possible by two years' work on rehabilitation of the company's plants completed in the autumn at a total cost, including buildings, of £1,248,670.

The Watford Electric & Manufacturing Co., Ltd., has decided to increase its capital by issuing an additional 24,000 6 per cent cumulative preference shares of 10s. each and 120,000 ordinary shares of 2s. each. The new capital is required to meet the cost of extensions to the factory and for additional working capital.

Aberdare Cables, Ltd.—Particulars of the company were published on Monday in connection with an application for quotation of the shares on the Stock Exchange. The authorized capital comprises 500,000 £1 shares, a total of £432,000 being issued and fully paid.

Simms Motor Units, Ltd., reports a net profit for 1947, before tax, of £18,184, as compared with £49,389 for the previous year. It is proposed to pay a dividend for the year of 5 per cent (against 10 per cent).

Kerry's (Great Britain), Ltd.—In a statement issued with the report and accounts, Mr. E. P. Richardson (chairman) says that the electrical and radio departments have donewell in spite of the serious effect on sales of the heavy increase in purchase tax.

Johnson & Phillips, Ltd.—After charging for maintenance of buildings, plant, etc., and providing £100,000 (nil) as a special stock reserve, the profits for 1947 amounted to £403,727 (against £373,296 for 1946). The net profit, after providing for depreciation, pensions, etc., and £200,000 (£120,000) for taxation was £123,619 (£159,820). A sum of £30,000 (£20,000) is allocated to research and development, but no provision is this year made for special contingencies reserve which last year received £50,000. It is proposed to pay a final ordinary dividend of 7½ per cent, again making 15 per cent for the year but on larger capital, and £133,988 (£128,396) is carried forward.

Babcock & Wilcox, Ltd.—Net trading profits for 1947 amounted to £1,242,757 (compared with £1,098,183 for 1946) to which is added £110,055 (£131,836) dividends and interest on investments, etc. As already reported the profit after providing for profits tax, contributions to staff pensions and deferred repairs was £825,755 (£766,109). Income tax absorbs £364,741 (£299,795) and £100,000 is placed to general reserve (against a similar amount for obsolescence). The distribution on the ordinary stock is maintained at 15 per cent for the year by a final payment of 7 per cent and a bonus of 3 per cent, and £161,909 (£163,907) is carried forward.

Glenfield & Kennedy, Ltd., recommend a final ordinary dividend of 5 per cent, making 10 per cent for the year, with a cash bonus of 10 per cent (same). The consolidated net profit for the year ended 31st March last was £172,185 (£109,610), after crediting £22,654 for taxation provisions no longer required and charging for depreciation, obsolescence and taxation.

Radio Rentals, Ltd., have declared an unchanged interim dividend of 7½ per cent.

The British Vacuum Cleaner & Engineering Co., Ltd., proposes to pay a dividend of 20 per cent for the past year (unchanged).

The Southern Areas Electric Corporation, Ltd., is maintaining its dividend for the year at 5½ per cent.

The Great Northern Telegraph Co. of Denmark has declared a final dividend of 7 (against 10) per cent, making 12 (15) per cent for the year.

New Companies

Insulated Conductors, Ltd.—Registered 3rd May. Capital, £10,000. Manufacturers of, and dealers in, electric wires and cables, wire ropes, cables, hawsers, chains, insulating materials, radio and electrical apparatus, etc. Regd.office: Cliffords Inn, Fleet Street, E.C.4.

John Mills (Electrical), Ltd.—Registered 30th April. Capital, £5,000. Manufacturers of, and dealers in, electrical apparatus, installers of lighting and power systems, etc. Directors: J. Mills (chairman) and Mrs. A. Mills. Regd. office: 196, Mauldeth Road, Burnage, Manchester.

Howard Motors (Nottingham), Ltd.—Registered 22nd April. Capital, £6,000. Manufacturers, rewinders and repairers of, and dealers in, electric motors, dynamos, transformers, etc. Directors: G. A. Wharton, F. T. Walton, J. W. Hearnshaw, K. A. Buxton, H. Widdowson and M. Howard. Regd. office: 1, King John's Chambers, Bridlesmith Gate, Nottingham.

Nu-Era Supplies (Cardiff), Ltd.—Registered 21st April. Capital, £1,000. Wholesale dealers in artificial lighting apparatus, electrical plant, etc. Directors: H. White, C. Halse and H. J. Minns. Regd. office: 11, Pembroke Terrace, Cardiff.

C. E. Barnes, Ltd.—Registered 17th April. Capital, £500. Electrical engineers and general electrical installation contractors, etc. Permanent managing directors: C. E. Barnes and G. F. Ellis. Regd. office: 18, Wharfedale Avenue, Southcoates Lane, Hull.

Richard Notley & Co., Ltd.—Registered 24th April. Capital, £1,000. Manufacturers and distributors of electrical fittings, lampshades, etc. Directors: F. C. Notley and M. L. Stanton. Regd. office: Abford House, Wilton Road, S.W.1.

Cico, Ltd.—Registered 27th April. Capital, £2,000. Electrical, electronic and mechanical engineers, etc. H. T. Spenceley is permanent managing director and chairman. Regd. office: 46, Billiter Buildings, 49, Leadenhall Street, E.C.3.

Increases of Capital

British Thomson-Houston Co., Ltd.—Capital increased by £2,000,000, in £1 ordinary shares, beyond the registered capital of £4,000,000.

Sterling Cable Co. (Aldermaston), Ltd.—Capital increased by £524,900, in 274,950 4½ per cent cumulative redeemable preference and 249,950 ordinary shares of £1, beyond the registered capital of £100. This increase is for the purpose of amalgamating the whole or part of the assets and undertakings of Sterling Cable Co., Ltd., and Lancashire Cables, Ltd. The company has been converted into a public company.

Liquidations

Adam Hilger, Ltd., and **E. R. Watts & Son, Ltd.**—Winding-up voluntarily. Liquidator, Mr. T. W. Hodgkinson, 48, Addington Square, London, S.E.5.—(A new company, Hilger & Watts, Ltd., was recently formed to amalgamate the businesses of the companies.)

Bankruptcies

C. W. J. Simmons, residing and carrying on business at 34, Brougham Hayes, Bath, electrical and radio engineer.—Application for discharge to be heard on 3rd June at the Guildhall, Bath.

STOCKS AND SHARES

IT is somewhat anomalous that the strength of Stock Exchange prices should be a noticeable feature while, at the same time, paucity of business is equally marked. The nationalization stocks—Electricity and Transport—keep very steady, attracting a fair amount of support from capital which is more concerned with its own conservation than with the question of income. Shares in the electrical equipment and manufacturing sections are quietly improving in price under the pressure of daily demand for securities which attract by reason of their soundness and stability, although in so many cases the companies have announced their intention to maintain dividends at rates not higher than those last paid.

The Shareholder's Share

The principle of dividend limitation is being generally accepted as the stockholder's contribution to the restriction of personal incomes. Exaggerated ideas about the relative importance of dividend-income are being corrected by a number of companies in this year's annual reports. Associated Electrical Industries is among the latest to do so. The company's pictorial illustration shows a pile of 240 pence, representing each £1 of the group's income, progressively reduced by outgoings. At the end of the line is 4d. for dividends. Wages and salaries take 7s. 4d., materials 7s. 1d., and taxation 1s. 2d.; 6d. is retained in the business. To correct other false impressions, Mr. Oliver Lyttelton showed at the annual meeting that the current 15 per cent distribution on the nominal capital is equivalent to a return of no more than 4½ per cent on the cash investment.

Company Results

Heatrae recently announced the maintenance of the dividend at 12½ per cent, and figures showing the net profit as practically double last year's. The 2s. shares are on offer at 5s., in a small way, to yield 5 per cent. Holders of British Electric Traction deferred stock are seeing none of the benefit from the several larger dividends declared this year by the company's subsidiaries. The proprietors are again receiving 50 per cent, although distributable earnings represent well over 100 per cent on the deferred capital. At 1800, the price of the £100 stock units is influenced by possible developments on the lines at present being discussed by Tillings, in connection with a sale of the transport interests to the Government.

" Blue Chips "

Babcock & Wilcox £1 shares, now 73s. 4d., have been a good market since the satisfactory profits statement. Although quoted among iron and steel descriptions in the Official List, they are regarded as being less concerned with nationalization uncertainties than are most others in that section. They yield £4 2s. 3d. per cent, which is about 5s. less than the return on Hopkinsons, now £5⅛, which have also improved since the results were announced. British Oxygen at £5 yield about 4 per cent, which does justice to the impressive report for 1947.

Price Changes

Rises in price during the past month are substantially greater than the declines. Amongst the former British Thermostat at 26s. 3d. are 2s. 6d. better. Advances have occurred in, amongst others, De La Rue 46s. 6d., Chloride 100s., Laurence, Scott 12s. 6d., Henleys 25s., Crompton 28s. and Crabtree 42s. 6d. Victoria Falls are 1/16 up at 7 11/16. Oriental Telephones have risen 4s. to 51s. 3d.; further improvements lifted Anglo-American Telegraph preferred to 119½ and Cable & Wireless preference to 127½.

Radio shares, after showing a general recovery, fell back upon serious statements as to the crisis that is reported to have developed in the trade. Cossors rose from 10s. to 13s. 3d., but reacted to 12s. E. K. Cole dropped from 16s. 6d. to 13s. 9d. Radio & Television are 1s. lower at 5s. 6d. E.M.I. show no change on the month at 17s. 9d.

Decca Dividends

Decca 1s. shares have suffered more than most industrials from dividend limitation. Although above the recent worst, the present quotation of 26s. 3d. is still some 15s. below this year's best price, and compares with £3 at one time last year. Hitherto, the tendency has been to discount fairly heavily the expectation of what the chairman described last December as a financial return in keeping with the creative work, effort, and capital expended on the development of the Navigator system. A second interim dividend of 20⅝ per cent has been declared in respect of the year ended in March. In 1946-7 a single interim of 33⅓ per cent was followed in December by a final making 112½ per cent in all. It is now announced that the dividend for the past year will not exceed that rate, which affords a yield of just over 4¼ per cent at the current price of the shares.

Miscellaneous Matters

The premium on W. T. Henley's new ordinary shares offered to stockholders at 21s., has risen another 1s. to 4s. on the strength of the big expansion in profits during last year. Dorman Smith Holdings 6 per cent preference shares are being dealt in at Manchester at about 1s. above the price of 22s. 6d. at which they were recently introduced; they yield a fraction over 5 per cent. Thomas Bolton & Sons' issue of 600,000 4½ per cent second preference shares at par was subscribed a dozen times over. Applications from the public were dealt with by ballot and then scaled down. The price opened on Monday in this week at a premium of about 2s. A line of Electrical Components 5s. shares is in the market at 14s.; they return £7 2s. 9d. per cent on the current 20 per cent distribution.

Switchgear in Germany

Report on Tour by British Team

AN account of a five weeks' tour of the British and U.S. zones of Germany, including Berlin, by a team organized by the B.E.A.M.A. for the British Intelligence Objectives Sub-Committee has been published as "Final Report No. 1429, Modern German Switchgear Practice" (Stationery Office, 25s. net). The party comprised Messrs. A. R. Blandford (leader), A. Allan (who compiled the Report), H. E. Cox and J. E. Stubbs, and Dr. W. B. Whitney (E.R.A.). Visits were made to seven manufacturers, nine power stations and substations and a coal mines research station.

Little progress was made during the war in equipment in service, but much preliminary work had been done on 400-kV a.c. equipment up to 1943, when it was stopped as a result of the decision of the Government to adopt d.c. for future long transmission lines. Thereafter development was carried out on d.c., including rectifiers and convertors, and by 1945 a 75-mile (120-km), 100-MW, 400-kV d.c. line was constructed including cables.

Transmission Tower Design

The pre-war 220-kV a.c. network of 2,000 route miles (3,219 km) had been extended by 500 miles (805 km) and now forms an inverted U from Vienna to Berlin, whence it continues to the Ruhr and to Switzerland. Transmission towers have reduced strength in the direction of the line, and there are very few broad-based towers at suspension points as on the British grid. Line clamps at suspension towers allow the conductor to detach itself from the insulator string at a critical angle from the vertical, relieving the strain in emergency. The system is then run with one conductor lying on the ground pending repairs.

Protection is by distance relays with long time delays, as Petersen coils extinguish most faults and earlier circuit breakers have insufficient rupturing capacity for fast operation, the duty being relieved by the decrement of the system. Copper and brass are seldom used and ceramics largely take the place of organic insulation. Except for low-voltage industrial gear, no tank-type oil circuit breakers are made.

Small-volume circuit breakers, using water or oil, are generally preferred to air-blast gear owing to complications in the use of high-pressure air. "Hard gas" circuit breakers appear to have been successful for lower-voltage installations. The arc-chute type of air-break unit has not been successfully extended to 6 kV. Expansion breakers (used largely at 3 kV and upwards), in which the arc is extinguished by gas pressure with the aid of spring loaded insulating discs in the enclosure, giving a multiple axial-blast effect, are considered inferior to British cross-blast designs. Trouble in operating the expansion type due to capacity currents is claimed to have been surmounted.

In air-blast designs two breaks per phase have proved inadequate for higher ratings at 110 kV. Five breaks with capacity grading (for 2,500 MVA) and six with resistance grading are being made to deal with rate of rise of recovery voltage without reference to system conditions. Resistance switching is not employed above 30 kV on air-blast breakers. The use of ceramic materials for blast pipes and power transmission rods has not abolished the need for conditioning air.

Pneumatic closing and spring opening are used at 6 kV and above; solenoid operation is not employed. Porcelain manufacture technique appears to be ahead of British in mechanical strength and available thicknesses. Single-piece porcelains for 400 kV, 10 ft (3 m) high, have been produced. Cap-and-pin post insulators are not used.

The 220-kV system stretching from the Ruhr to Switzerland was started in 1929 to transmit power south from thermal stations and north into the middle of Germany from water-power stations, and not for grid interconnection. Trouble from corona was experienced with later lines with conductor diameter of 1 in. (25 mm), though not with the original lines of 1·65 in. (42 mm), because an earth on one phase causes the voltage on the sound phases to rise to line values above earth and the corona current that flows is not cancelled by the Petersen coil.

D.C. System

Present indications are that d.c. transmission without switching would be more economical than a.c. for 800 MW and 500 miles (805 km). A 2 × 200-kV system would be superimposed on the existing 220-kV a.c. system. The latter would be enlarged to form a 220-kV grid, since in the absence, as yet, of any method of d.c. switching a d.c. grid would be out of the question. Rectifiers comprise four Graetz-connected six-phase units, each shifted 15 deg in phase from its neighbour, giving in effect a twelve-phase unit.

The Report contains ninety pages of text giving details in support of the above and other matters, eighty-six page diagrams and forty-three page photographs.

Engineering and Marine Exhibition

The next Engineering and Marine Exhibition will be held at Olympia from 25th August to 10th September, 1949. To accommodate new exhibitors, the whole of Olympia has been secured.

Situation in Argentina

Growth of Local Manufacture

THE first of the overseas economic surveys to be issued since the end of the war by the Export Promotion Department of the Board of Trade is a report by Mr. J. G. Lomax, C.M.G., H.M. Minister (Commercial) in Buenos Aires, on "Argentina: Economic and Commercial Conditions, 1947" (Stationery Office, 2s. 6d.).

After reviewing the general economic trends during the war years the report (which is dated October, 1947), deals with the situation following the election of a new constitutional administration in June, 1946, the real beginning of the post-war period in economic affairs.

In October, 1946, a Five Year Economic Plan was tabled in Parliament. This included proposals to develop the water-power resources of the Republic which would take about fifteen years to complete and would raise the total hydro-electric output from 45,000 kW to 1,400,000 kW, calling for 4,500 km of transmission lines. It was planned to bring the control of all power and gas resources under the authority of the State.

Electricity generated in the country showed an upward trend until 1943 when it reached 2,926 million kWh, but in spite of increasing demand by expanding industry, the trend has since been downward, the figure for 1945 (the latest year shown in the report) being 2,793 million kWh. The Government was to invite tenders for twelve hydro-electric power stations in the course of 1947, which would have a total capacity of 230,300 kW, while preliminary studies were commenced of the 800,000-kW hydro-electric plant to be built at Salto Grande on the Argentine-Uruguayan frontier.

Electrical Apparatus Market

The inadequate supplies of electrical plant during the war encouraged the commencement of local manufacture, and as the supplies from overseas have been limited since the war, local production continues to expand. Before the war the United Kingdom had a substantial share of the trade in fractional h.p. motors, and despite the increase in local manufacture there is still a shortage.

Local production of insulated wires and cables has increased, but is still far from sufficient to meet the demand. During the period under review substantial shipments of electric conductors were received from the United Kingdom, including vulcanized rubber wire and underground cables. Restrictions by the Central Bank have, for the time being, resulted in the cessation of commercial imports of covered and armoured cables, though there is a heavy demand which cannot be met by local factories. Total imports of armoured cables for electricity and telephones amounted to over 2,200 tons in 1946 and over 3,700 tons in the first six months of 1947. Fair quantities of insulators of earthenware and porcelain for electrical use were imported during 1946 and 1947, the main source of supply being Brazil.

Imports of accumulators have fallen owing to the world shortage of lead, and, for the same reason, local production has declined. Imports of standard types of automobile batteries as well as stationary types for farm lighting are no longer required, but special kinds of accumulators for marine, aeronautical and automotive services must still be imported.

Lamps and Domestic Appliances

Restrictions on the import of electric lamps have resulted in increased local production though quality, in general, is not up to that of the imported lamps. Local manufacture of fluorescent tubes has commenced on a small scale. Imports of incandescent and fluorescent lamps amounted to 148·8 tons in 1946, a figure well below that of the average pre-war year. Imports increased at the beginning of 1947. Local production of domestic, office and industrial electrical appliances has improved in quality and quantity, but imports of special industrial fittings and, to a lesser extent, of office fittings continued, mainly from the United Kingdom, until the imposition of total prohibition.

Local manufacture of electrical domestic appliances has increased considerably during the last few years, particularly electric irons, toasters, kettles, hotplates and cookers, and although their quality is moderate and prices are high, production is sufficient to meet the needs. At present, demand is principally for motor-driven household appliances such as vacuum cleaners and floor polishers, for special new lines such as washing machines, and to a lesser extent, for modern up-to-date models of other types of appliances. Vacuum cleaners and floor polishers are mainly from the United Kingdom and Sweden, irons from the United Kingdom and washing machines from the United States.

There are now local firms manufacturing motors and compressors for domestic refrigerators, but demand for imports has been well maintained. Local industry is fully equipped to provide all the domestic refrigerator cabinets required, and also the glass-fronted containers in shops. The usual practice is to send components for mounting and finishing in Argentina. Imports have been mainly from the United States, and to a smaller degree from the United Kingdom, Sweden, and latterly from Belgium and Italy. The import of assembled radio sets is prohibited, and imports now consist of components and unassembled component parts only, principally from the United States.

NEW BOOKS

Vector Introduction for Students. Electrical Installation Practice.

The Symbolic Method of Vector Analysis ; the "j" Operator Simply Explained. By W. H. Miller, A.M.I.E.E. Pp. 28; 18 figs. Classifax Publications, 9, White Moss Avenue, Manchester, 21. Price 3s.

This booklet, which is intended primarily for students, is a useful introduction to the basic mathematical principles underlying the use of symbolic algebra and the operator "j" in vector problems.

Explaining the conception of $\sqrt{-1}$ the author shows its application to vectors. Rectangular and polar forms are indicated, together with the methods of transformation from one to the other. Addition, subtraction, multiplication and division as applied to complex quantities are dealt with in a logical manner and diagrams illustrate the geometrical significance of each particular operation. Finally the author gives proofs of the various formulæ used in the book and a summary of symbolic algebra.—A.R.P.

Science at War. By J. G. Crowther and R. Whiddington, C.B.E., F.R.S. Pp. 185; figs. 102. H.M. Stationery Office, Kingsway, London, W.C.2. Price 2s. 6d.

In this publication, issued under the aegis of the Department of Scientific and Industrial Research, some of the ways in which scientific research aided the war effort are discussed in a manner that should make them understandable to those with little technical knowledge. Four subjects are dealt with—radar, operational research (see *Electrical Review*, 5th March), atomic research and maritime applications. In each section the problem is first stated from the national viewpoint and that of the fighting men, then the methods adopted by scientists are described; finally the use of the results and their effect on the course of the war is explained.—C.O.B.

Electric Wiring of Buildings. By F. Charles Raphael, M.I.E.E. (Second Edition). Pp. 353; figs. 185; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 20s.

This is, of course, of its kind the electric wiring book *par excellence*. Due to the author's long and varied experience with all types of installations the book contains just that little additional information that makes all the difference, coupled with outstanding simplicity and adequacy of exposition. The late author's own alternative title for the book was "What the Wireman ought to Know" and any wireman who knows all this is a very good wireman indeed.

The author's well-known concentration upon proved, sound practice is evident in every line of this book and those seeking information on the unorthodox or spectacular innovation will look in vain; but for real sound observation, precept and practice the wireman need look no further.

The reviewer would question only one statement in the book: he doubts if the ordinary rewirable fuse would blow at 1·5 times its rating; the usual acceptance is 2·5 times. A suggestion for a future edition would be that the three paragraphs dealing with the ring-main circuit should be grouped and expanded into a chapter, with adequate illustration, in order to ensure that what the wireman ought to know in this connection is available for him. The present brief references, although complete, probably reflect the uncertain state of the proposal at the time of revision of this book.—T.C.G.

Books Received

Radio—Questions and Answers. Vol. II. Radio Receivers. By E. M. Squire. Pp. 152; figs. 146; index. Sir Isaac Pitman & Sons, Ltd. Price 10s. 6d.

Handbook to the Factories Act and Truck Acts. By Joseph Owner (3rd Edition). Pp. 152; figs. and index. Sir Isaac Pitman & Sons, Ltd. Price 7s. 6d.

Fundamentals of Radar. By Stephen A. Knight. Pp. 128; figs. 97; index. Sir Isaac Pitman & Sons, Ltd. Price 10s.

Technique of Microwave Measurements. Edited by Carol G. Montgomery. Pp. 939; figs. and index. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Price 60s. in U.K.

Elements of Radio Servicing. By W. Marcus and A. Levy. Pp. 475; figs. and index. McGraw-Hill Publishing Co., Ltd. Price 27s. in U.K.

Free Expression in Industry. By J. J. Gillespie. Pp. 167; figs. and index. Pilot Press, Ltd., 45, Great Russell Street, London, W.C.1. Price 10s. 6d.

Electric Clocks. By S. J. Wise. Pp. 144; figs. 137; index. Heywood & Co., Ltd., Drury House, Russell Street, Drury Lane, London, W.C.2. Price 10s. 6d.

Radio and Car Battery Handbook. By Charles Fleming. Pp. 128; figs. 78; index. George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2. Price 5s.

Television Simply Explained. By R. W. Hallows. Pp. 198 ; figs. 97 ; plates 16 ; index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 9s. 6d.

Lorry Drivers' Wages and Conditions of Employment. By G. W. Quick Smith, LL.B. (LOND.). Pp. 76. Iliffe & Sons, Ltd., Dorset House, Stamford Street, S.E.1. Price 5s.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.*

1942

H. K. WARR-LANGTON (F. Sauter Akt.-Ges. Fabrik Elektr. Apparate). — "Electric regulating apparatus." 4912. 14th April, 1942. (601003.)

A. L. Cianchi.—"Magnetically-operated sealed-container switches." 13877. 2nd October, 1942. (601004.)

1943

A. L. Cianchi.—"Magnetic indicating or control devices." 787. 15th January, 1943. (601005.)

J. P. Loumiet.—"Process and apparatus for regulation of steam generators." 11391. 3rd July, 1942. (600906.)

British Thomson-Houston Co., Ltd.—"Insulation of electrical windings." 13807. 25th August, 1942. (600907.)

1944

Bendix Aviation Corporation.—"Production of piezo-electric crystals." 2388. 6th October, 1942. (Addition to 600190.) (600909).

General Electric Co., Ltd., A. Abbott, C. J. O. Garrard, and E. S. Friedlander.—"Over-speed protection of turbo-generators." 3850. 1st March, 1944. (601008.)

V. H. Rumsey, R. A. Smith, K. A. Wood, J. L. Putman, F. E. Lutkin, W. B. Macro, and T. S. Evans.—"Electro-magnetic radiating or receiving apparatus." 6574. 7th April, 1944. (Cognate applications 9900/45 and 9901/45.) (600805.)

Standard Telephones & Cables, Ltd.—"Apparatus for testing magnetic and or dielectric materials." 7990. 4th June, 1943. (600913.) "Apparatus for testing and examining metals." 11644. 16th September, 1943. (600914.) "Apparatus for investigating surface layers of metals." 11957. 30th September, 1943. (600915.) "Automatic and semi-automatic telephone exchange systems." 24602. 12th February, 1944. (600822.)

Raytheon Manufacturing Co.—"Electron-discharge devices." 8058. 26th November, 1941. (601011.)

Chamberlain & Hookham, Ltd., S. James, E. A. Webb, and W. F. Braines.—"Totalizing means for use with a group of electricity measuring instruments." 9835. 22nd May, 1944. (600806.)

Farnsworth Television & Radio Corporation.—"Electrical frequency comparison apparatus." 12721. 30th April, 1943. (601012.) "Frequency comparison apparatus." 12943. 15th April, 1943. (601013.)

W. E. Stilwell, jun.—"Electric circuit-breakers." 13622. 16th July, 1943. (601015.)

A. F. Burgess (Zenith Radio Corporation).—"Radio receiver circuits." 15143. 9th August, 1944. (600809.)

Western Electric Co., Inc.—"Arrangements for producing marks on a screen indicating elapsed time particularly for use in radar devices." 15193. 12th August, 1943. (601016.)

W. F. Abbott.—"Electrical systems for limiting temperature." 16395. 9th February, 1943. (Divided out of 565014.) (600811.)

J. F. O'Brien.—"Connection means for electrical conductors." 18348. 2nd October, 1943. (600814.)

Philco Radio & Television Corporation.—"Refrigerator shelf." 20965. 27th October, 1943. (600920.)

Marconi's Wireless Telegraph Co., Ltd.—"Electron discharge device." 21627. 12th August, 1943. (600922.)

General Electric Co., Ltd., and R. T. J. Hill.—"Cathode-ray tubes."— 23189. 22nd November, 1944. (601022.)

1945

A. H. W. Beck, J. H. Burrow, and C. S. Wright.—"Electron-collecting electrodes for electron-discharge devices. 968. 11th January, 1945. (600925.)

H. Meadows, Ltd., and W. W. Hamill.—"Thermostatically-operated regulating or controlling apparatus." 1386. 17th February, 1945. (600826.)

Associated Newspapers, Ltd., and F. W. Jarvis.—"Picture telegraph instruments." 9292. 13th April, 1945. (600936.)

H. M. Bayard and R. J. C. Roquet.—"Method of and apparatus for duplexing for transmission systems." 11164. 11th October, 1943. (600939.)

M. N. Yardeny.—"Electrical control apparatus for placing a useful load in any desired position." 11256. 3rd May, 1945. (601024.)

British Broadcasting Corporation, J. L. Bliss, and H. Page.—"Matching of the impedance of a load to that of a transmission line." 12113. 14th May, 1945. (600940.)

Marconi's Wireless Telegraph Co., Ltd.—"Biasing circuit for cathode-ray oscilloscopes and amplifiers." 13063. 25th May, 1944. (600943.)

Soc. Rateau.—"Exhaust heads of steam turbines." 13614. 16th July, 1942. (600835.)

Sperry Gyroscope Co., Inc.—"Pulse radar object locating systems." 14804. 9th June, 1944. (600945.)

Bristol Aeroplane Co., Ltd., and F. M. Owner.—"Gas-turbine power-plants." 15880. 21st June, 1945. (600946.)

H. Muller.—"Single phase transformers, chokes and the like." 17017. 4th July, 1945. (600842.)

Patelhold Patentverwertungs- & Elektro-Holding, Akt.-Ges.—"Transformers for passing from electrically symmetrical to electrically unsymmetrical systems and *vice versa*." 17872. 21st August, 1944. (Addition to 600627.) (600843.)

Brush Development Co.—"Transducers for radiating and/or receiving vibrational energy." 20952. 2nd June, 1944. (600853.)

Standard Telephones & Cables, Ltd.—"Electric pulse communication systems." 21148. 19th August, 1944. (600955.)

Westinghouse Electric International Co.—"Control systems for vapour-electric valves of the make-alive type." 22615. 2nd September, 1944. (600959.) "Variable-speed power drives embodying a sectionalized motor." 30480. 16th November, 1944. (600879.)

Calor, Soc. Anon. pour la Fabrication des Appareils de Chauffage et des Appareils à Usages Domestiques par l'Electricité.—"Mounting of thermostatic devices on electric kettles and like apparatus." 23680. 6th June, 1944. (601041.)

G. A. Hinds.—"Electric razors." 24544. 21st September, 1945. (600857.)

G. R. F. Jardine.—"Electric burglar and like automatic alarm devices." 26108. 6th October, 1945. (600968.)

Babcock & Wilcox, Ltd., and R. A. Taylor.—"Fuel delivery means for mechanical stokers." 26134. 8th October, 1945. (600971.)

Allmanna Svenska Elektriska Aktiebolaget.—"Electrical ringing of bells." 26137. 28th November, 1944. (600972.)

British Thomson-Houston Co., Ltd., and A. P. Castellain.—"Stroboscopic observation of shafts and like rotating members." 26170. 8th October, 1945. (600980.)

General Electric Co., Ltd., and J. C. Turrall.—"D.c. electric motor control systems." 26178. 8th October, 1945. (600981.)

Carr Fastener Co., Ltd., Benjamin Electric, Ltd., G. W. Clark, and H. G. A. Kay.—"Preselective electrical coupling devices." 26192. 8th October, 1945. (600984.)

Yorkshire Switchgear & Engineering Co., Ltd., and A. Riley.—"Electric switch boxes." 26199. 8th October, 1945. (600986.)

F. B. Dehn (Fairbanks, Morse & Co.).—"Axial air gap dynamo-electric machine." 26936. 15th October, 1945. (600868.)

Radio Apparat Co. Aktieselskabet H. Ebbensen & I. C. Jensen, and O. E. Grue.—"Mercury electric switches." 27218. 6th December, 1943. (600872.)

Standard Telephones & Cables, Ltd., H. Wolfson, and B. Thomson.—"Manufacture of thin copper articles." 27542. 19th October, 1945. (600873.)

S. Midhat.—"Magnetic cores for solenoids and applications thereof to indicating or recording apparatus." 27774. 6th February, 1941. (601044.)

J. J. Over.—"Electrical toasting appliances." 28321. 26th October, 1945. (600875.)

British Thomson-Houston Co., Ltd.—"Flat-iron." 30203. 14th November, 1944. (600878.)

O. B. Sneath.—"Amplifiers employing multi-grid valves." 31404. 21st November, 1945. (600884.)

Budd Induction Heating, Inc.—"Inducting coils and the manufacture thereof." 32237. 11th January, 1945. (600996.)

Allmanna Svenska Elektriska Aktiebolaget.—"Means for modifying abrupt voltage changes in electric arc or discharge converter valves." 32252. 23rd December, 1944. (600888.)

Acieries de Gennevilliers.—"Carriers for trolleys for collecting electricity from overhead conductors." 32464. 22nd June, 1943. (600998.)

M-O Valve Co., Ltd., and N. L. Harris.—"Gas and/or vapour containing discharge devices associated with high-frequency electrical resonant circuits. 32490. 30th November, 1945. (600889.)

Smart & Brown (Engineers), Ltd., and C. W. Clark.—"Snap-action switches." 33149. 7th December, 1945. (601000.)

1946

G. A. Hinds.—"Electric razors." 28129. 20th September, 1946. (600897.)

1947

J. F. O'Brien.—"Conductor units for electric wiring systems." 5594. 2nd October, 1943. (Divided out of 600814.) (600848.)

Amended Specifications

566156. Standard Telephones & Cables, Ltd., & ors. "Circuits for counting electrical impulses."

593990. R. S. Webley. "Pulse-selecting circuit arrangements."

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Ashington.—19th May. U.D.C. Electric wash boilers for sixty houses on the North Seaton Road site. B. Preston, surveyor, Town Hall.

Benfleet.—5th June. U.D.C. Vertical-spindle centrifugal pump, complete with motor and wiring, at the Council's Rushbottom Lane sewage pumping station. Surveyor, Council Offices, Thundersley, Essex.

Bridgnorth.—22nd May. Borough Council. Electrical installation in fifty-seven Corporation houses. Borough engineer, Municipal Offices, College House.

Dundee.—26th May. North of Scotland Hydro-Electric Board (Dundee Area). Multi-core high- and low-voltage paper-insulated cables. (See this issue.)

India.—Office of the High Commissioner. Supply of 3,890 domestic type refrigerators.—Forms of tender from the Director General, India Store Department, 32-44, Edgware Road, London, W.2. (7th May.)

Herefordshire.—County Council. Engineering, electric lighting and power installation, etc., at new primary school, Hunderton, Hereford. (See this issue.)

Isle of Ely.—19th May. County Council. Installation of electric lighting and power in screwed conduit, in connection with the conversion of Bowthorpe Hall, Wisbech, into a maternity home. County architect, County Hall, March.

South Africa.—BLOEMFONTEIN.—1st July. City Electricity Department. Overhead line material.*

Spain.—SEVILLE.—Compania Sevillana de Electricidad. 10,000-kW turbine, 18,200-kVA generator, 18,200-kVA transformer, switches and measuring instruments for a hydro-electric scheme. Manufacturers should communicate direct with the Seville firm and notify the Export Promotion Department of the Board of Trade (reference 33566/48) of any action taken.

Uruguay.—MONTEVIDEO.—9th July. Usinas Electricás y Telephonos des Estado. Supply of 62 transformers ranging from 600 kVA to 5,000 kVA.*

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Orders Placed

London.—L.C.C. Accepted. Electrical installation at Berger Road School, Hackney.—William Steward & Co. Electrical installation at Ackmar Road School, Fulham.—Buchanan & Curwen.

Manchester.—Transport Committee. Accepted. Stores for twelve months:—Mechanical parts and section insulators.—B.I. Callender's Cables. 250-V cables.—Henley's. 660-V and 250-V v.i.r. cables.—Mersey Cable Works. Electrodes for overhead chassis welding.—Met.-Vickers Electrical Co. Unit cells and twin cells.—Oldham & Sons.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Boldon.—Houses (26), Cleadon; N. Hindmarch, U.D.C. surveyor, Council Offices.

Brighton.—Houses (32), Westfield Crescent; Braybons, Ltd., builders, Princes House, North Street.

Houses (110), Hollingbury estate; borough engineer, King's Road.

Bury.—Dairy, Georgina Street, Bury District Co-operative Society; Architect's Department, Co-operative Wholesale Society, Ltd., Balloon Street, Manchester, 1.

Chadderton.—Houses (70), Melbourne Street; F. W. Pexton, U.D.C. architect, Town Hall.

Chester.—Houses (50), Blacon No. 2 site, for T.C.; Thomas Warrington & Sons, Ltd., Circular Drive, builders.

Extensions to works; Williams & Williams, Ltd., Reliance Works.

Chester-le-Street.—Houses (98), for R.D.C.; council architect, Great North Road, Birtley.

Coventry.—Alterations at secondary school buildings, Copthorne Road (£22,419); Gilmartin (Coventry), Ltd., builders, 15, Ashington Grove.

Departmental stores and shopping arcade, Trinity Street and Broadgate, for Owen, Owen, Ltd. (£100,000); R. Hellberg, architect, 94, Armorial Road.

Homes for aged people, Sherborne Street (£30,000); D. E. E. Gibson, city architect, 1a, Warwick Row.

Croydon.—Eleven blocks of maisonettes, New Addington estate (£46,542), for T.C.; S. A. Gregory, Ltd., builders, 27, Chapel Road, Worthing.

Edinburgh.—Houses (830) and shops (22), Moredun estate; city architect, City Chambers.

Factory, West Harbour Road, Granton; Scottish Orlit Co., Ltd., 79, George Street.

Epsom.—Remodelling main hospital block, additions and alterations to boiler house, workshops and laundry, etc.; county architect, Kingston-on-Thames.

Erith.—Traditional brick houses (82), Lesney Farm estate; J. H. Clayton, borough engineer, Council Offices.

Exeter.—Houses (52), western section of Countess Wear estate; city architect, 2, Southernhay West.

School for infants, Topsham Road; Royal West of England Residential School for the Deaf, Haven Road.

Falkirk.—Rolling mill extensions (£1,000,000), for the British Aluminium Co., Ltd., London; Architects' Department, 9, Rosebery Crescent, Edinburgh.

Grays.—School, Little Thurrock; H. Conolly, Essex county architect, Chelmsford.

Grimsby.—Houses (96), Nunsthorpe site; J. V. Oldfield, Municipal Offices.

Guildford.—Research laboratory; Vokes, Ltd., Henley Park.

Heywood.—Offices and additions to works, River Street; J. Swallow, Ltd.

Hillingdon.—Extensions to Nurses' Home at County Hospital (£200,000); C. G. Stillman, county architect, Middlesex House, Vauxhall Bridge Road, S.W.1.

Hornchurch.—Houses (122), for War Agricultural Executive Committee; surveyor, Council Offices, Billet Lane.

Hove.—Houses (50), Sunninghill; T. R. Humble, borough surveyor.

Kingston-on-Thames.—Rebuilding south wing of nurses' home, and other work, Kingston County Hospital; county architect, County Hall.

Three blocks of flats, Grange site, for T.C.; Sydney Clough, Son & Partners, architects, 115, Park Street, W.1.

Kidderminster.—Extensions to works; Carpet Trades, Ltd., Mill Street.

London.—EDMONTON.—Extensions to Pathological Department, and adaptations for nurses' home at North Middlesex County Hospital, Silver Street; C. G. Stillman, county architect, Middlesex House, Vauxhall Bridge Road, S.W.1.

SOUTHWARK.—Two six-storey blocks of dwellings, Doddington Grove, for Borough Council; Harry Neal, Ltd., builders, 117, Baker Street, W.1.

Maidenhead.—Factory, Cox Green, Vandervell Products, Ltd., Western Avenue, Acton, W.3; C. B. M. Smith, architect, Uxbridge Road, Stoke Poges, Bucks.

Maidstone.—Houses (52), Shepway estate; borough surveyor.

Manchester.—Office block, conference hall, etc., Kingston Road and Wilmslow Road; British Cotton Industry Research Association, Shirley Institute, Didsbury

Middleton.—Houses (92), for aged persons, Hollins, Boarshaw and Moorclose estates; J. Pollard, borough engineer, Town Hall.

Newcastle-on-Tyne.—Workshop block in Northumberland Road (£50,000); education architect.

Engineering block behind Hancock Museum for King's College; Edwards & Manby, architects, 52, Eldon Place.

Houses in Dewley Road (64) and Armstrong Road (38); G. Kenyon, city architect, 18, Cloth Market.

Newcastle (Staffs.).—Extensions to pottery works, Longport, Gaskell and Grocott; Hollins, Jones & Oldacre, architects, Lloyds Bank Buildings.

Nottingham.—Factory premises, Meadow Lane; Henton & Chattell, Ltd., 9, Radcliffe Road, West Bridgford.

Reading.—Motor engineering works, Basingstoke Road, for W. G. Harris, Ltd.; Canning & Sergeants, builders, Winnersh Works, Wokingham.

Rotherham.—Houses (202), Blackburn site (£238,635); O. Weaver & Sons, builders, Harlington Lane, Mexborough.

Ryton-on-Tyne.—Houses (50), Greenside estate; U.D.C. surveyor.

Salford.—Houses (144), Fairhope estate, Eccles Old Road; city engineer, Town Hall.

Stoke-on-Trent.—Works, for Richard Crittall & Co., Ltd., Great Portland Street, London; Watkins & Willis, architects, National Provincial Bank Chambers, Burslem.